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FOOD INDUSTRIES

NATIONAL EDITION

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

Cooking food for quick frozen plate meals

JULY 1947

More on Continuous Processing Methods

IFT 1947 Meeting — Staff News Report

New Reefer Car For Frozen Food

Why a Packaging Laboratory?

Sources of Odors In Storage Eggs

Frozen Plate Meals In Mass Production

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

JULY, 1947 Volume 19, Number 7

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THE COVER

These units at Maxson Food Systems, Inc., are used for the preparation, under careful laboratory control, of vegetables, sauces, gravies and soup stock. The plant, at Queens Village, New York, turns out complete meals frozen on specially coated paper plates. See story on page 104.

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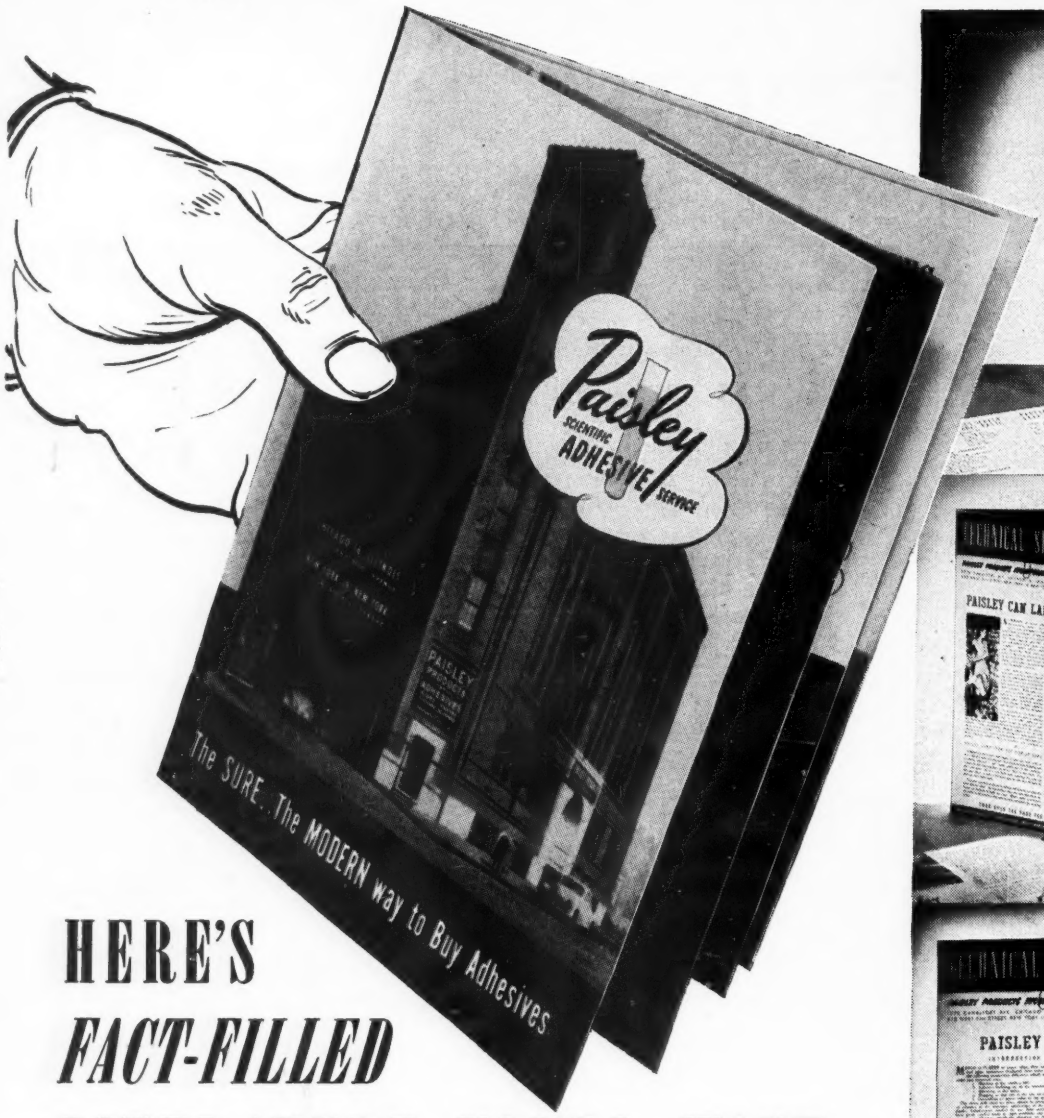

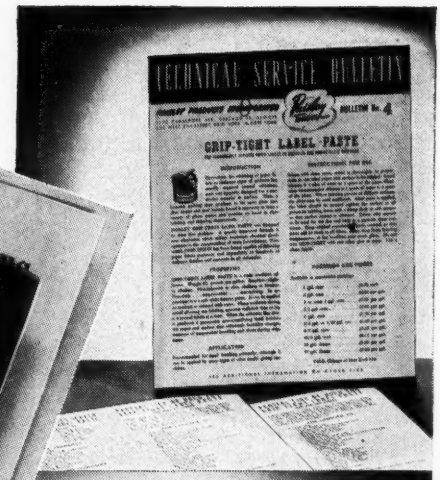

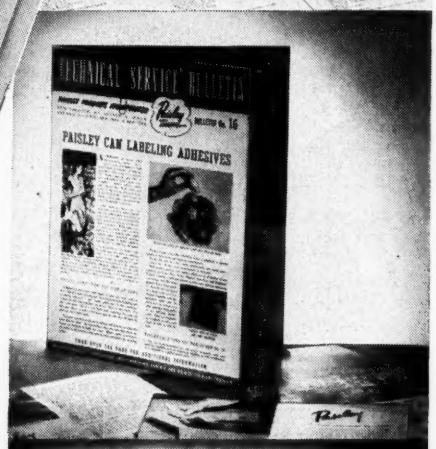

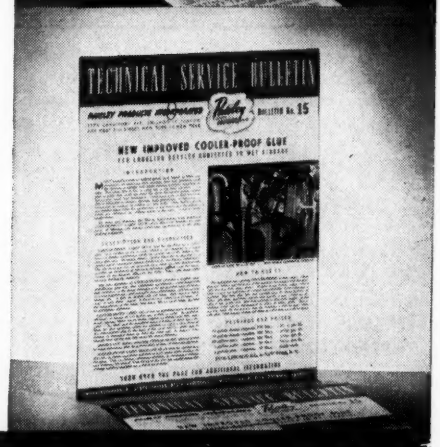

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Problems and Opportunities

FOR the good of our national economy and for the sake of jobs for everybody who wants to work, we need to reduce the cost of feeding ourselves from about 35 percent to about 25-30 percent of the national income.

Either costs of processing must be reduced or costs of raw materials must be less. Or maybe both will need to come down a little. But here is something that looks very much like a dilemma. Raw material costs should come down but the government has a mandate from Congress to keep certain prices up through the device of support prices. Hence, the cost of many raw materials for the food processor cannot now be reduced below the support price.

Relief Purchases Hold Prices Up

A further problem that hinders cost reduction stems from the purchase of food to relieve distress in occupied nations, in allied countries, and for offsetting the trend to Totalitarianism or Leftism that always follows when hunger is the uppermost thought in every mind.

World Not Trying to Feed Itself

Production managers must evaluate an even more significant factor in their forward planning: The amazing size and stupendous cost of the armed forces throughout the so-called civilized world. All this non-productive expenditure of manpower and money creates a food deficit problem that concerns us and affects our efforts to lower food costs as long as our government is doing what it can to alleviate hunger and want.

Hanson W. Baldwin, of the New York Times, calculates that 19,000,000 men are under arms at a cost of roughly $27 billions a year. A quarter of them are in the warring Chinese armies. Russia accounts for slightly less. Both countries need food. Russia has cleverly siphoned off considerable quantities of foodstuffs by demands on helpless nations, and by the insidious process of alarming other small nations to the point where they remain fully mobilized and curtail food production. Armies and navies are consumers, not producers.

Some Costs Likely to Stay High

While the U.S.A. tries to make up the deficits of food elsewhere there is scant expectation that we can reduce the raw material costs of certain of our domestic foods. When we analyze the effects of our foreign policy on our own manufacturing costs we come out with something like the following that may spell opportunity to certain processors.

As long as this nation has the will to send food to the hungry nations (no matter why it is done) the domestic prices of grain will continue high at home. This will mean that the cost of flour and the cost of feeding poultry and meat animals will remain high despite efforts to reduce the cost of food to domestic consumers. This will preclude any noteworthy cost reductions for flour millers, cereal processors or bakers, or for meat packers or brewers.

Outside of the processors whose raw material costs reflect the price of grain, there remain the processors of fruits, vegetables, oil seeds, fish; and processors of imported raw materials like coffee and cocoa, and the confectioner. Only a few seem to have freedom from legislative and foreign policy influences.

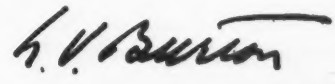
Fruit and Vegetable Processors on Spot

The whole complex problem seems to indicate that fruit and vegetable processors are less hampered by floors and support prices,. than many other branches of the food processing industry.

Their position is, however, far from enviable. In fact, for many of them it is most uncomfortable, for distributors seem to sense their greater freedom of action by insistent demands for lower prices and better quality, yet seem to accept the prices of meats, bread, butter and eggs with only moderate complaint—probably because these products are the more rapid turnover items.

Long Range Opportunity

Notwithstanding the problems of the fruit and vegetable processor, the current period is also one of potential opportunity for fruit and vegetable processors, provided they and their growers cooperate. The times offer them an opportunity to capture a bigger share of the consumer food dollar spent for processed foods than heretofore, provided costs can be moderately lowered all along from farm to retailer. It will not be easy, but until our national foreign policy as well as price support programs are modified, the opportunity will continue to exist whereby the present situation can be turned to long range profit.



EDITOR

The Talk of the Industry

Error

• A REGRETTABLE error occurred on page 89 of May Food Industries. If you care to do a kindly act, please make the correction in your copy, by changing the 70 percent to 65 percent, (line 14 column 2) so that no one may be misled. The idea is that if food costs the nation 35 percent of its income there is not enough left to sustain the national economy at its normal prewar level.

• IT is odd how few professional economists realize the place of food costs. Right now one of the informed ones is trying to discover where the extra 5 to 10 percent above normal comes from. He believes it has come from rents that have been under OPA control and have risen only 8 percent from the base.

• ALL the disquieting news about food shortages in Germany, and the continued need to ship food to the U. S.-British Zone, was foreseeable long ago. Those who conducted the Yalta conference in the middle of the war and decided on the partitioning of Germany could have been better advised had they sought advice.

The United States drew an area that never had fed itself, the deficit in normal times before war hit Germany being about 25 percent. And the British Zone was not much, though a little better. Russia drew the food surplus area.

All this was known years ago. Those who negotiated the Yalta Agreement either ignored the experts or didn't care. And from the way postwar events have been shaping up it looks as if the United States must either keep on shipping food to Germany or else abandon the area to whoever wants to take it over.

• A BILL by Senator Capper has been before Congress to outlaw advertising of alcoholic beverages including those that are sometimes known as high wines. Also there have been hearings on the bill—hearings that have resembled the memorable hearings preceding enactment of the present Food & Drug Law. W.C.T.U. objects to any advertising that would suggest that nice people, smartly dressed people, would bend an elbow. Seems the idea is that such advertising produces a false impression. An opponent of the bill countered with a proposal that advertising of cosmetics be banned on comparable grounds: the use of cosmetics would create a false impression.

• OF all the absurdities of distributors' unbalanced inventories that have come to light none is more absurd than that of the Arkansas wholesaler who had 2,000 cases of canned minced clams—an area where clams are seldom eaten. One surmises that they were bought at a time when distributors would buy anything.

• NOW that prices are being corrected to normal relationships, a group of left-wing economists—many of them former OPA executives—calling themselves "Committee for Economic Stability," have proposed a plan to curb deflation. For ex-OPA men like Chester Bowles and Leon Henderson to desire to *prevent* price declines is remarkable.

They ask for a 10 percent reduction in retail prices, a 15 percent wage boost, tax relief in lower brackets, extension of unemployment compensation to almost everybody, continued rent controls, cutting house building costs 20 percent and $5 billion increase in foreign lending by Export-Import Bank.

• SECRETARY OF INTERIOR KRUG wants to exploit commercial fishing in the tropical islands of the Pacific in order to help feed the millions of underfed peoples in the triangle that lies between Kwajalein, Samoa and Hawaii. The little matter of refrigeration and ice on fishing boats, seems, however, to have escaped his attention.

Hors d'Oeuvres

• When you lick a postage stamp these days, according to the Farm Journal, you are consuming an American product. Tapioca glue from Malaya has been replaced by waxy maize starch. Farm lobbyists for bigger stamps should register immediately.

• *Molasses travels at the rate of 3 min. 41 sec. per foot, according to a research device put out by an electrical manufacturing company. They rate milk and water 4 second stuff. Maybe that's why these liquids are so different from Bourbon.*

• Pathfinder cites the slump in sales of penny candy as evidence that kids are getting extravagant. We consulted a committee of six year olds on this proposition. "Candy for a penny?" they asked, excitedly. "Where?"

• *Pennsylvania proposes a law requiring the price on every container distributed in package form. Texas records one requiring that "Texas" must appear on the label of any product packaged in the state. We are going to quit this foolishness and go into the label printing business.*

• Food Fair Stores started a "courtesy to customers" campaign last August. They report a 75 percent reduction in customer complaints. Nevertheless, we advise caution in the adoption of such a revolutionary policy.

• *W. F. Williamson, of the National Coffee Association, cabled the offer of a qualified expert on coffee brewing to the British Ministry of Food. Citizens of U. S., he said, "could hardly be expected to leave U. S. in great numbers unless assured adequate beverage in England." Might work. Adequate beverages certainly lured 'em over there during the* 1920s.

• A U. of Oklahoma professor predicts the treatment of paper to emit the scent of the product being advertised, as, for instance, a sirloin steak smothered in onions. This is not to be confused with some present day radio commercials, where the odor develops only in the mind of the listener.

• *If we aren't careful, says the head of the Pacific Biological Laboratories, we are going to discover soon that all the sardines are in cans. Seems we are digging into the breeding stocks. And that's where you can go too far in crowding even a sardine.*

• There are supposed to be 17,700 tons of tin available to satisfy a world demand for 60,000 tons. If you can use a substitute metal, we have a large stockpile down at Fort Knox that is just laying there. J.A.J.J.

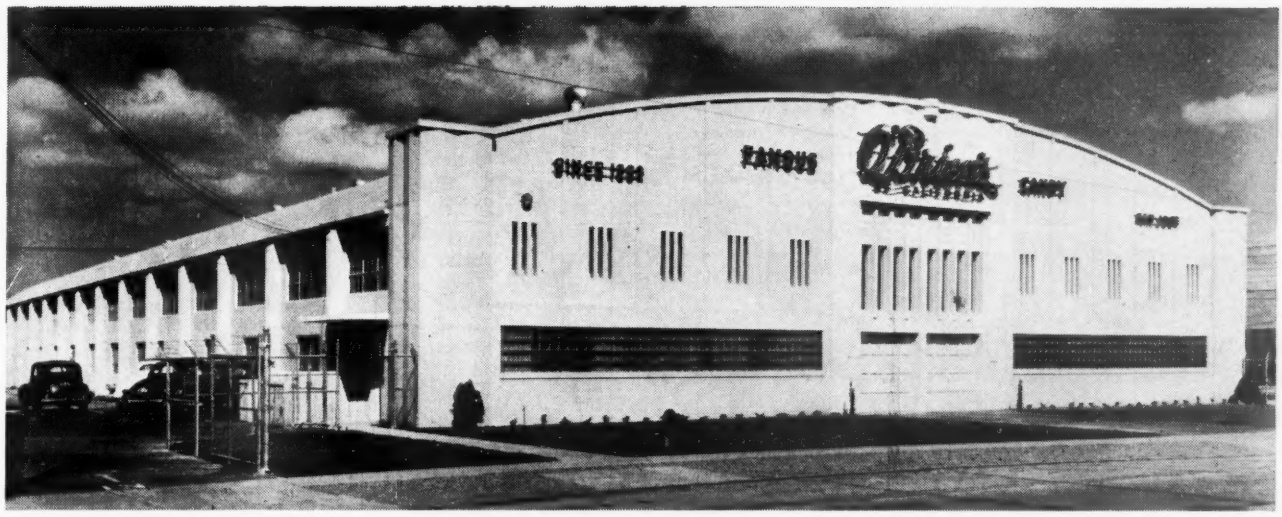


Fig. 1. O'Brien's of California, one of the West's most modern candy plants, was planned for a $10,000,000 annual volume.

Progress Toward Continuous Processing

Processing is nearly continuous after intensive development work and design of unusual equipment. Company limits production to six items. Mounting five kettles on revolving table makes for greater efficiency

By JOHN KLEIBER, Plant Engineer
O'Brien's of California, San Jose, Calif.

THE problems of handling sticky, plastic, and semi-plastic materials from one unit to another have made the development of continuous processing lines, for all types of confections, a difficult, if not impossible matter. At O'Brien's, "Project No. 1" of the technical department is the improvement of an already highly mechanized materials handling and candy processing line. Wherever machines can be substituted for manual handling, with a resulting increase in efficiency and economy and without endangering quality, the company has made every effort to design and build equipment to perfect a continuous line.

In essence, candy making is the concentration and blending of a mixture of various ingredients and sirups by boiling. Upon cooling, the product is an amorphous solid or semi-solid mass, its hardness primarily depending upon the temperature to which it has been boiled.

Only sirups are used as sweetening ingredients, with a resulting labor savings of from 3 to 5 men and of extra storage space which would be necessary if bagged sweeteners were used. There are further savings in handling, inasmuch as sirups are relatively free-flowing, ready for mixing and processing, whereas most dry ingredients would have to be dissolved.

Located in the Santa Clara Valley, near almond and walnut groves and close to a ready source of cream and butter, O'Brien's of California was established in 1868. Now under the management of the third generation of O'Brien's, the company is occupying its recently built plant (Fig. 1) which has a planned capacity for $10,000,000 volume in annual production. While the new plant has not yet reached this production peak, it presently is using annually over 1¼ million lb. of peanuts (approximately 25 carloads), 10 carloads of almonds, 2 carloads of Brazil nuts, over 150,000 lb. of butter, and more than 6 million lb. of sirups as ingredients in candy manufacture. During the war, the company delivered approximately 63 million vacuum packed tins of candy to American soldiers.

Sirups are pumped or flow by gravity from railroad tank cars to one of six 10,000-gal. storage tanks located in the underground storage room (Fig. 2A). Three of these tanks are for corn sirup storage, two for liquid sugar, and one for molasses. Tank cars, in which corn sirup is shipped, are equipped with heating coils. In order to facilitate unloading, a steam line is attached to the coil intake and the corn sirup heated to 100 deg. F. in order to reduce its viscosity. Liquid sugar and molasses flow without heating.

Storage tanks are lined with a resin plastic which is baked, in several coats, upon the interior sur-

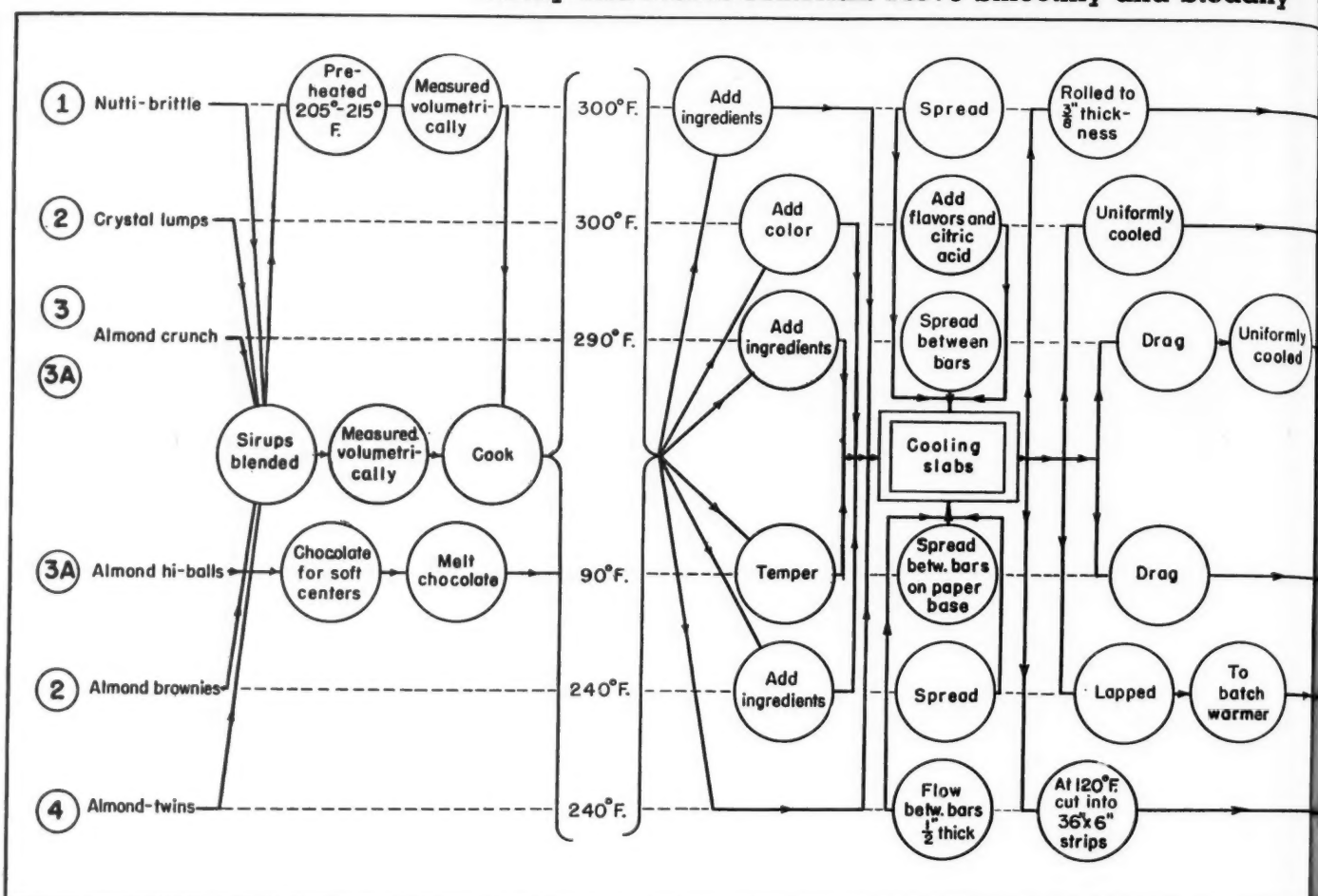


Fig. 2A. Schematic flow diagram of the 6 production lines for candy manufacture at O'Brien's. Each line is keyed by number.

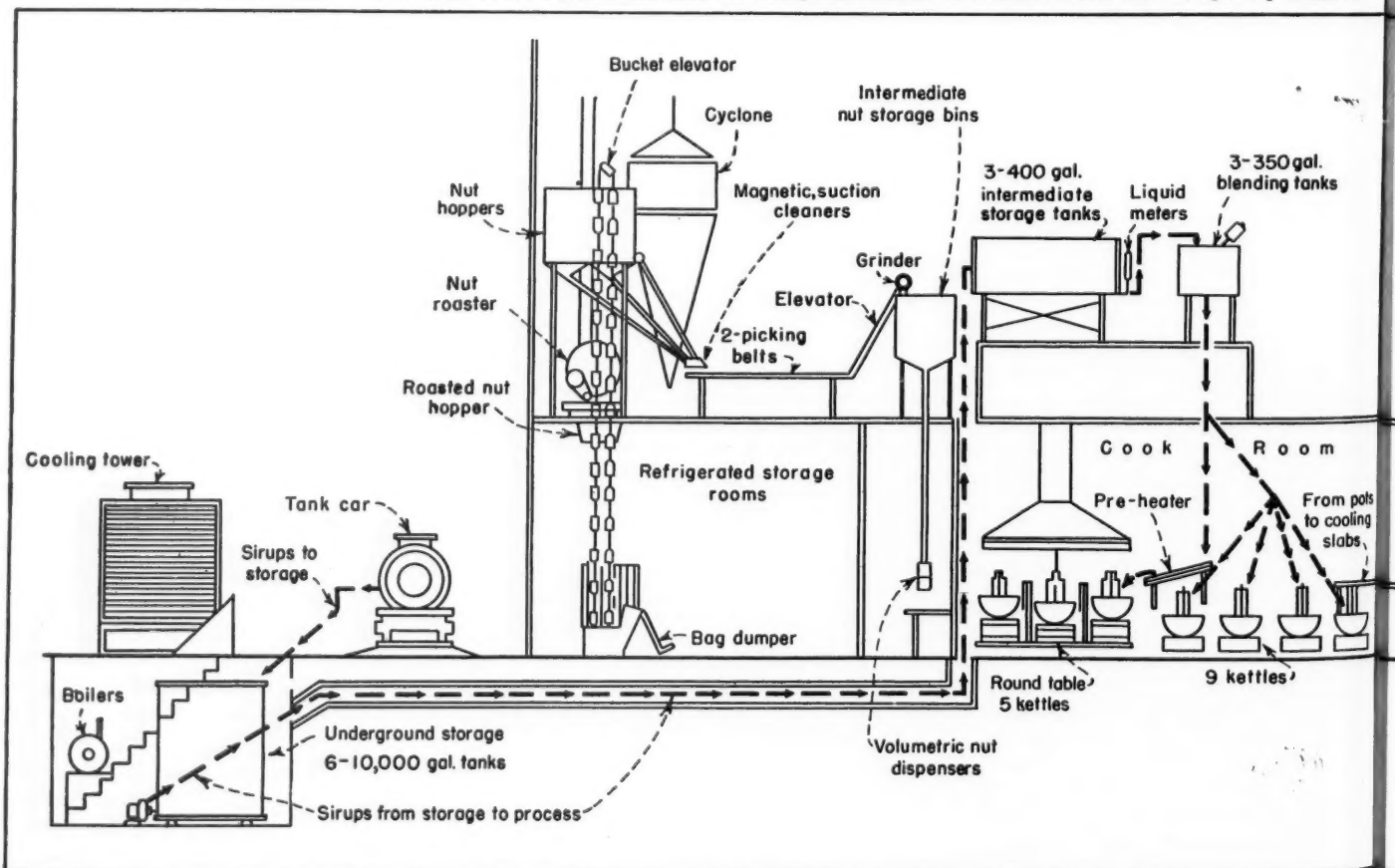
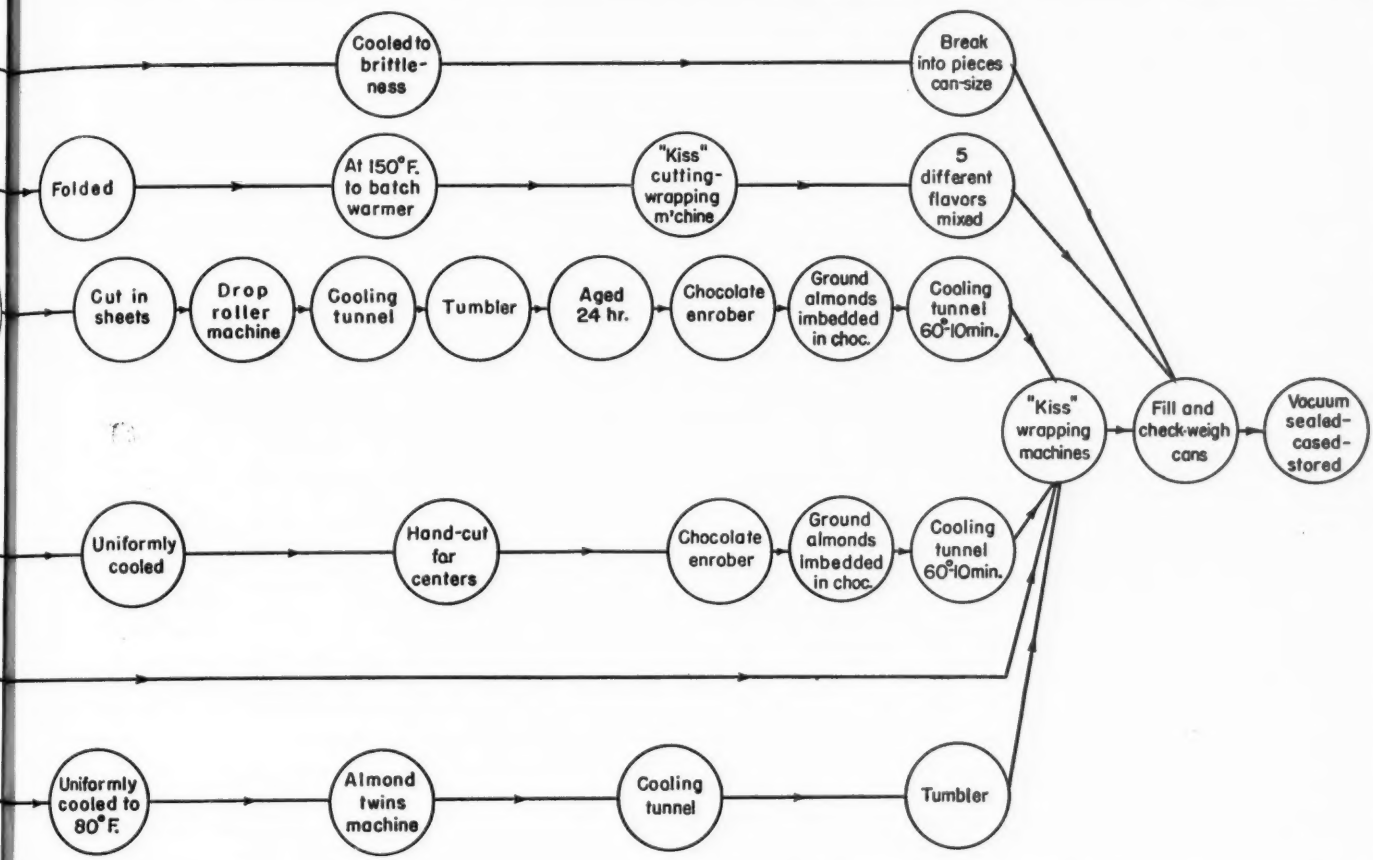
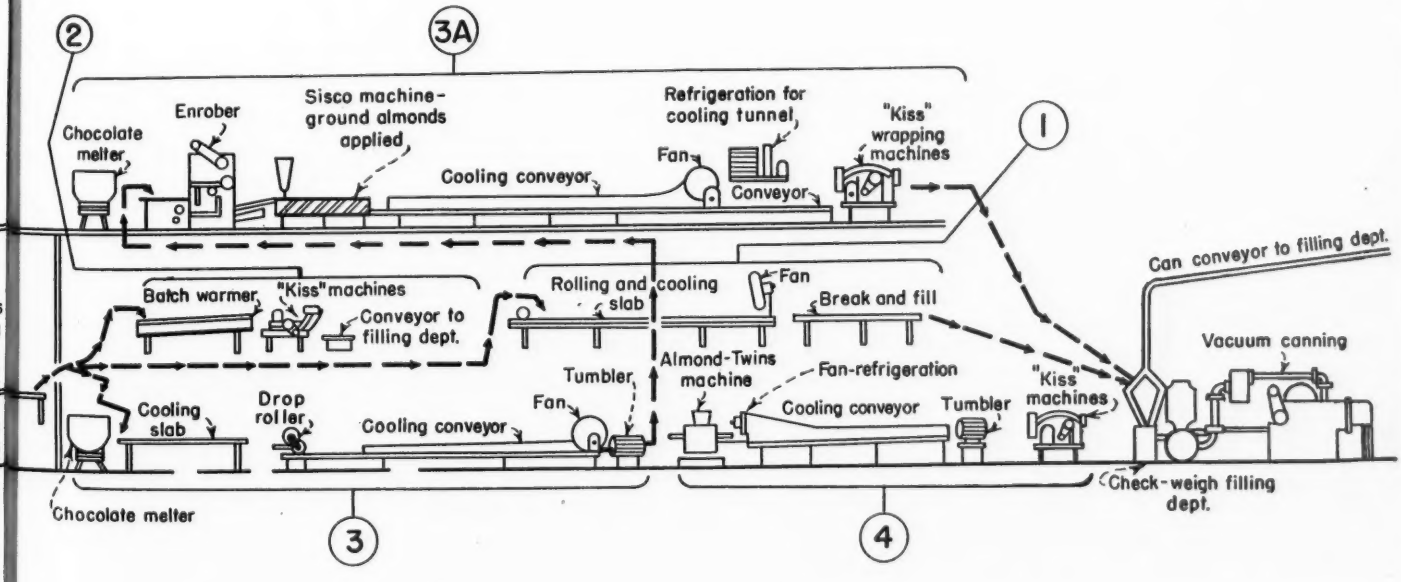


Fig. 2B. Products flow diagram shows each unit process in the manufacture of the 6 kinds of confections at O'Brien's.

Through the O'Brien Candy Company's Processing Lines



to facilitate integration with the unit process diagram. Fig. 23. Cooking temperatures for the various products are indicated.



The key numbers, from 2A, designate the section, or sections, of the production lines used in the manufacture of each confection.

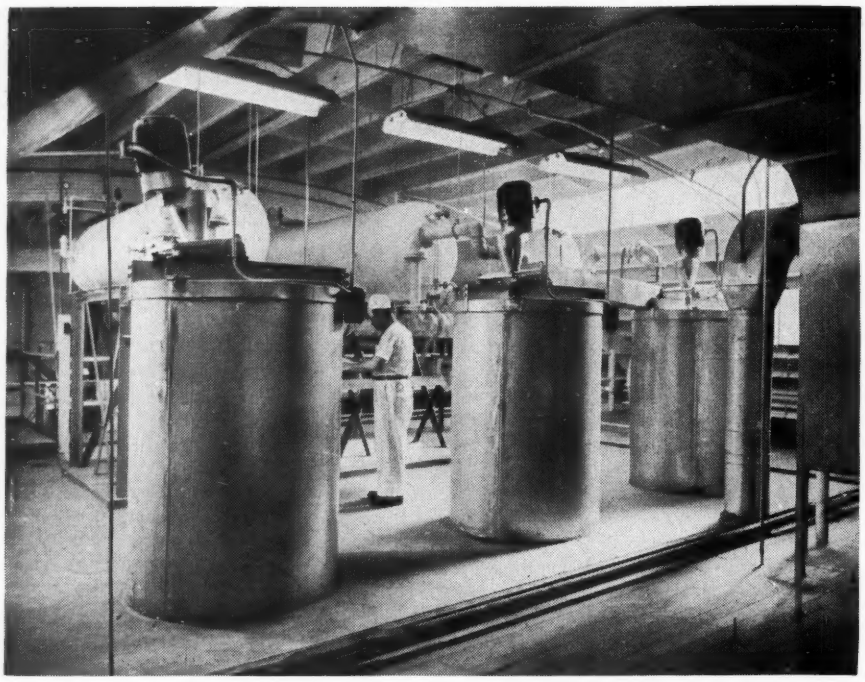


Fig. 3. In the background are the liquid sugar, corn sirup, and molasses intermediate storage tanks from which the 350-gal. blending tanks in the foreground are supplied.

faces of the tank. It provides a smooth, hard surface at a low cost.

Corn sirup has a high coefficient of viscosity. The viscosity of 43 deg. Bé. sirup is 300 poises at 90 deg. F. and 80 poises at 110 deg. F. (See F. I. Nov. 1946, p. 78.) It must be heated to approximately 100 deg. F. before it can be pumped efficiently to the intermediate storage tanks in the plant but, since these tanks have a capacity of only 400 gal., it is not necessary to heat the entire contents of the large storage tank. For this purpose, steam coils, surrounded by a baffle to permit localized heating, are located inside and at the outlets of the tanks. Before pumping, heat is generated in this restricted area by maintaining steam at 40 psi. in the coils.

While subsequent pumping of these sirups presents no significant problems, the movement of corn sirup requires a 10 hp. positive displacement pump with a 4-in. delivery, whereas the other sirups are moved easily by a 5 hp. pump. All piping into the plant is designed with wide angles or curves to permit the smooth, easy flow of heavy sirups. The pipe carrying corn sirup is lagged with magnesium insulation to retain temperature of the sirup. After filling the intermediate corn sirup storage tanks, the pump is reversed to clear all remaining sirup from the pipe. Otherwise, the sirup would tend to become highly viscous when cold, and its removal from the pipe would necessitate heating.

After an operator opens the proper valves in the basement storage room, the intake of sirups is controlled at the intermediate storage tanks located on the second floor of the plant (Fig. 3). There are three of these tanks, one for each sirup—liquid sugar, corn sirup and molasses. Pumps in the underground storage room are actuated from this point and float valves automatically shut off pumps

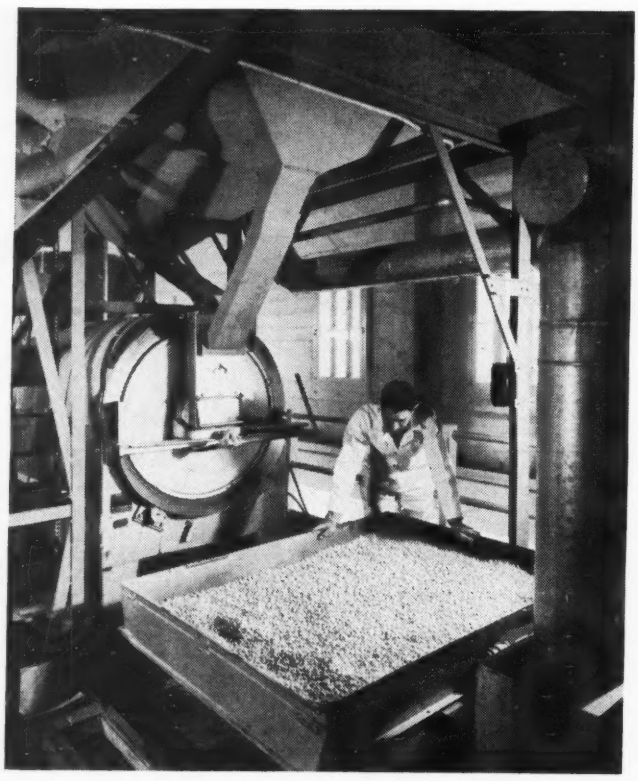


Fig. 4. Gas-fired nut roaster and cooling tray. Nuts are cooled by circulation of air through the perforated bottom of cooling tray and dumped, through the hinged side, into rectangular hopper, left. A bucket elevator carries them to the overhead hopper.

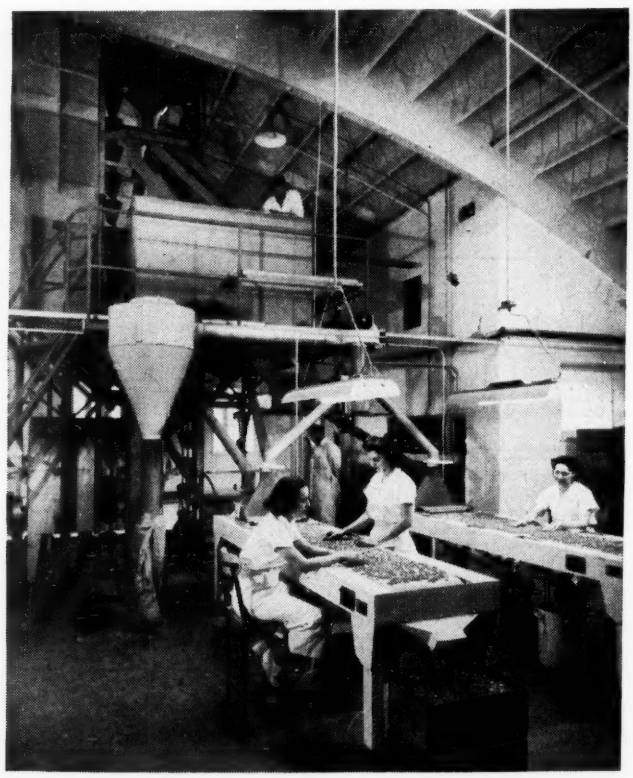


Fig. 5. Nuts, from overhead storage bins, are fed to picking belts, where magnetic detectors pick up tramp metals, suction cleaners remove lighter extraneous material and women remove poor quality nuts. Cleaned nuts are now elevated to storage bins.

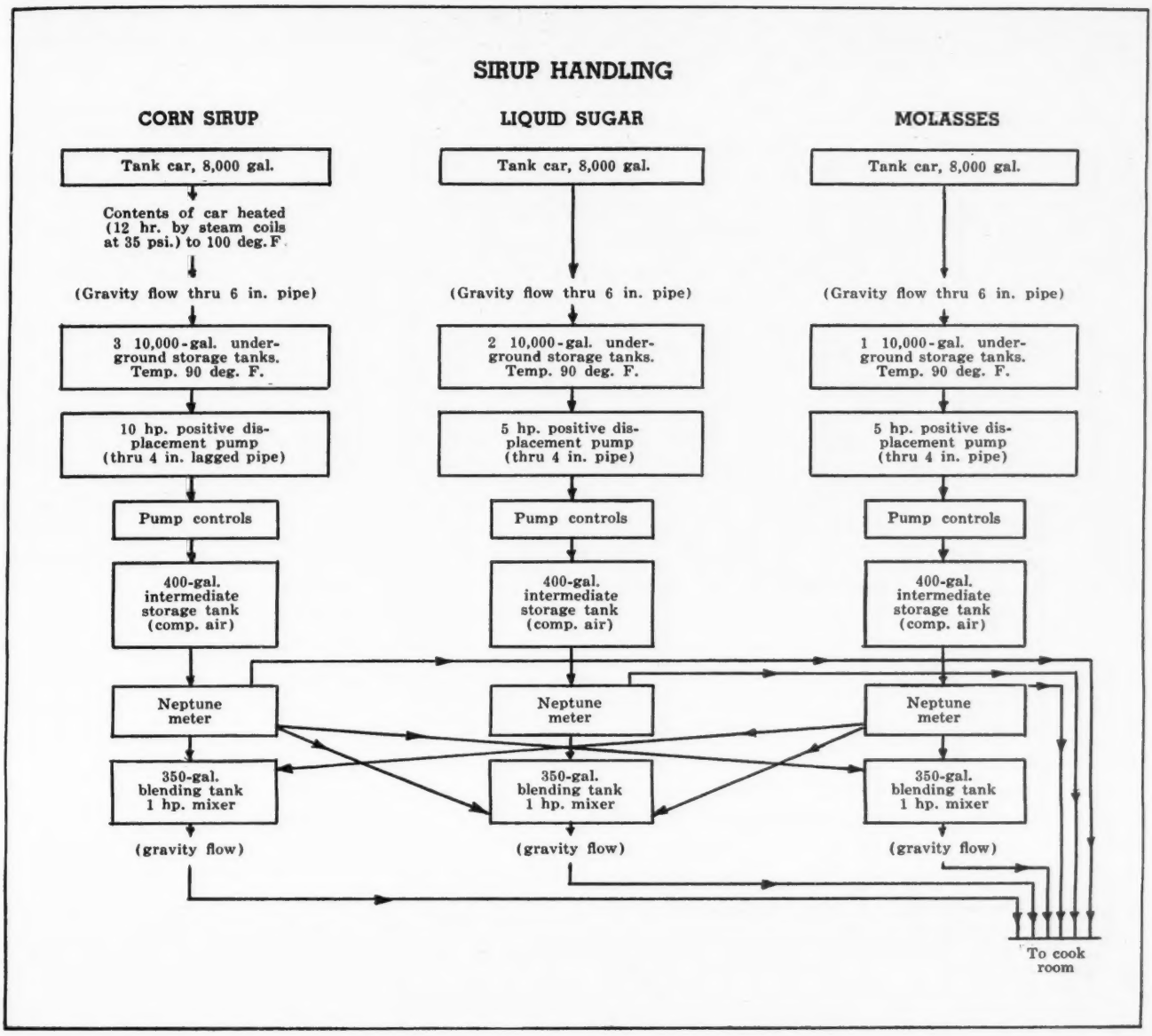

SIRUP HANDLING
CORN SIRUP
LIQUID SUGAR
MOLASSES
Tank car, 8,000 gal.
Tank car, 8,000 gal.
Tank car, 8,000 gal.
Contents of car heated (12 hr. by steam coils at 35 psi.) to 100 deg. F
(Gravity flow thru 6 in. pipe)
(Gravity flow thru 6 in. pipe)
(Gravity flow thru 6 in. pipe)
3 10,000-gal. underground storage tanks. Temp. 90 deg. F.
2 10,000-gal. underground storage tanks. Temp. 90 deg. F.
1 10,000-gal. underground storage tanks. Temp. 90 deg. F.
10 hp. positive displacement pump (thru 4 in. lagged pipe)
5 hp. positive displacement pump (thru 4 in. pipe)
5 hp. positive displacement pump (thru 4 in. pipe)
Pump controls
Pump controls
Pump controls
400-gal. intermediate storage tank (comp. air)
400-gal. intermediate storage tank (comp. air)
400-gal. intermediate storage tank (comp. air)
Neptune meter
Neptune meter
Neptune meter
350-gal. blending tank 1 hp. mixer
350-gal. blending tank 1 hp. mixer
350-gal. blending tank 1 hp. mixer
(gravity flow)
(gravity flow)
(gravity flow)
To cook room

Fig. 6. No solid sweeteners are used by O'Brien's. Sirups are handled by gravity flow and by positive displacement pumps.

when tanks are filled with sirup.

From these intermediate tanks, sirups are metered by formula into one of the three blending tanks, or can be drawn direct to the cook room. It is possible to measure by weight or by volume from these tanks. Meters are set at a predetermined amount and then shut off automatically. To move these heavy sirups rapidly from the intermediate storage tanks air pressure at 100 psi. is applied.

Dry Material Handling

Nuts and other ingredients for the confections manufactured at O'Brien's are stored in one of two refrigerated rooms. There are 50,000 cu. ft. of space in these two reefers where a constant 45 deg. F. temperature is maintained. From the storage room, bagged or cased nut meats (only shelled nuts are used) are first dumped into a hopper. At the base of this hopper is a timed shutter which determines the volume of nuts that drop from hopper into elevator buckets. This shutter can be set to open and close at intervals that control the flow to the exact volume of the various varieties of nuts needed to fill one bucket of the elevator. A time-relay switch actuates a solenoid which, in turn, operates an air cylinder that opens and closes the shutter. From the storage room, nut meats are elevated to the second floor to be roasted or temporarily stored before they are cleaned and sorted.

Almonds or peanuts, that have been roasted in the gas-fired roasters, are collected in a large perforated bottom tray which rests on wheels and track (Fig. 4). The nuts are cooled by air suction. When cooled, this car of roasted nuts is moved to a hopper and dumped. From the hopper, a bucket elevator carries them to overhead bins.

Both raw and roasted nuts flow through spouts from these bins to the picking belts (Fig. 5). Here they first pass under a magnet, then a suction cleaner. Dust, shells, and other extraneous material picked up by the suction cleaner go to the cyclone dust collector. The belt then carries the partly separated nuts to women operators who remove poor quality nuts and other inedible material that might remain. From the ends of these picking belts the nuts now move, by elevators, to intermediate storage bins. Here some almonds are ground for two of the candies.

From these intermediate storage bins, the nuts flow, by gravity, through spouts to the floor below where they are hand-measured, volumetrically, to be used in the several products.

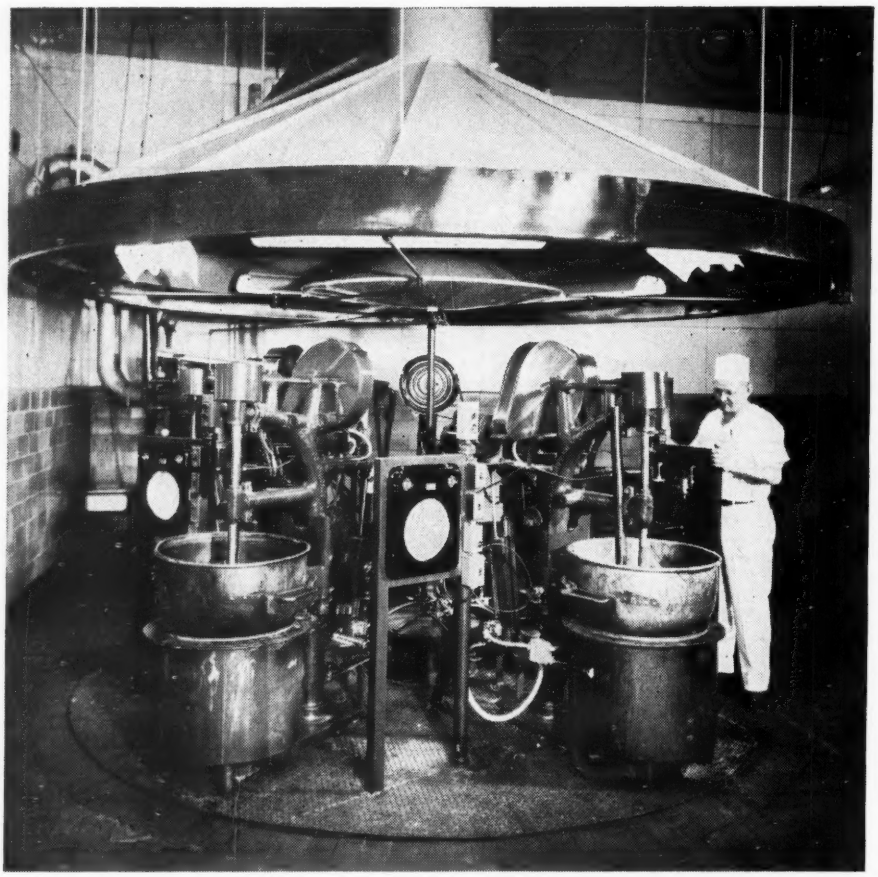


Fig. 7. The "round-table," on which are mounted 5 completely equipped cooking kettles, is constructed on a central axle which rests in bearings. Rotation is controlled so that it alternately moves, then stops, to enable operators to add ingredients.

Fig. 8. Each kettle is equipped with a compressed air operated recording temperature controller. Candy-makers use the recording charts to determine when to add ingredients.

The cook room has a tile floor and the same tile extends 5 ft. up the walls. The remainder of the walls and the ceiling are of enameled steel.

In the cook room are a total of 14 kettles, nine of which are stationary and five of which are on the "round-table," (Fig. 7). The round-table is constructed on a central vertical axle which rests in bearings. It is powered by a 5 hp., gear-head motor and its number of stops is controlled by an automatic time-relay switch. Gas for heating the five kettles flows through a flexible joint valve and electric power is conducted through a commutator when this equipment is operated. Both commutator and flexible valve are located on the vertical axle which supports the round-table.

Each one of the five kettles is completely equipped, including compressed air operated recording temperature controllers. As with the stationary kettles, (see Fig. 8), these recorders are used by the candy-makers when they add various ingredients during the process as the temperature increases. Then, for later inspection, these records indicate the number of batches produced, at what temperatures and, also, by indications of temperature fluctuations, if all ingredients have been added at proper intervals.

A two-man crew can produce up to 175 batches of candy per 8-hr. day on this round-table. Blended sirups from the floor above flow first over a preheater—an inclined steam-jacketed table with channeled surface which disperses the flow of sirup thinly over its surface. Sirups are preheated to 210 deg. F.

The two operators are so stationed that one controls the addition of preheated sirup to the kettles while the other, at a second position, adds the other ingredients of the candy. Rotation of the table is controlled so that it alternately moves, then stops, in order that operators may have time to add ingredients. Removing the kettles and pouring the cooked product on the cooling slabs after cooking is an operation requiring two men.

Product Flow

The company produces only six products. They are:

	Figs. 2A and 2B Key Nos.
Nutti-Brittle	(1)
Crystal Lumps	(2)
Almond Crunch	(3 and 3A)
Almond Hi-Balls	(3A)
Almond Brownies	(2)
Almond-Twins	(4)

Up to the point of cooking, these six products follow essentially the same flow line (see Fig. 2B). Thereafter, cooking temperatures vary and different process units are utilized to produce various confections.

Nutti-Brittle (pecans, cashews, walnuts, brazils, toasted almonds and peanuts coated with hard candy) requires the most manual handling, but from the standpoint of the number of processing units required it is the least complex of

Fig. 9. The author oversees first tests of new Almond-Twins machine which was designed and built by the company.

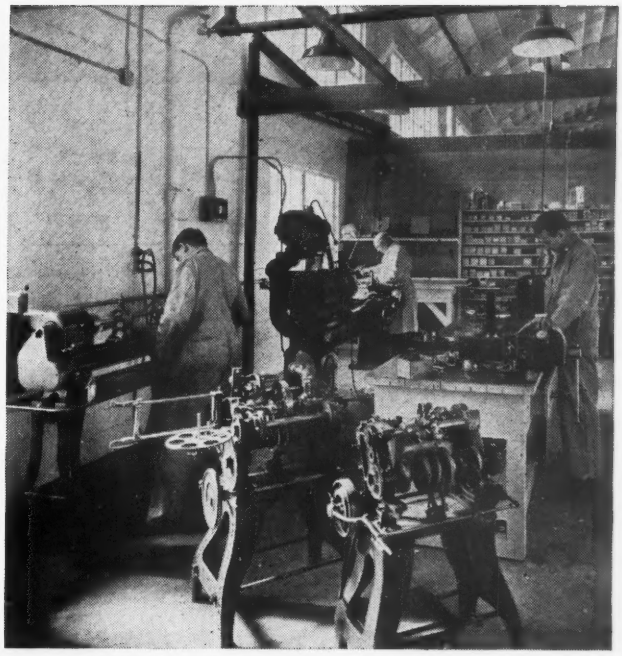


Fig. 10. The company maintains a completely equipped machine and repair shop where plant machinery is built and maintained.

all products manufactured.

Almond Brownies (a caramel containing ground roasted almonds) and Crystal Lumps (fruit-flavored hard candies) are first cooled to handling temperature, then moved to batch-warmers where operators form the candy into "ropes" and feed it through the cutting-wrapping machines. Brownies flow direct, on conveyors, to the filling department. Crystal Lumps are gathered, by flavors, in boxes, to be mixed later, prior to filling.

The manufacture of Almond Crunch and Almond Hi-Balls requires less hand labor, yet more process units are needed than in the other products. Almond Crunch is a toffee-type candy, coated with milk chocolate, encrusted with toasted almonds. Almond Hi-Balls are a soft chocolate center coated with chocolate and ground almonds.

The soft, milk chocolate centers for Almond Hi-Balls are cut by hand. The toffee centers for Almond Crunch are machine-formed by a special machine built by the company which molds these centers in sheets of candy. The sheets are then cooled and finally broken into individual centers in a tumbler or rotary reel. Both soft and hard centers are elevated to the enrober line when milk chocolate and toasted ground almonds are added mechanically. Both products are then conveyed through a tunnel where they are cooled by refrigerated air. Mechanical wrapping follows, then transfer to the filling department.

In the enrobing machine, hot chocolate flows over and envelops each center as it is agitated on a screen. The centers move on through the machine and excess chocolate flows through the screen back to a reservoir to repeat the cycle. The enrobed centers are conveyed to a Sisco machine where they tumble from one short slanting conveyor to the next, into beds of ground, toasted almonds which become embedded in the chocolate.

Almond-Twins (two almonds inclosed in caramel), the newest confection to be added to O'Brien's line of candies, are produced by a machine designed and built by the company. Two strips of caramel enter the machine from opposing sides and almonds are fed from a hopper through holes in the top plate of the machine. The machine produces a sheet of ellipsoidal candies joined together with caramel. They are separated later by tumbling.

With the exception of Nutti-Brittle, the other five products are all conveyed, after they are wrapped, to the hand-filling and check-weighing departments and thence to the vacuum canning department. All candies are sealed under 27-in. vacuum in 1-lb. candy cans.

Fig. 11. Absence of supporting posts in this warehouse facilitates the storage and handling of dry ingredients and supplies by the fork-lift-pallet system.

New Reefer Car Solves Frozen Food Shipment Problem

Commodities are now kept at 0 deg. F. in a newly developed rail car. Refrigeration is accomplished with a split-absorption system, using liquid anhydrous ammonia. Principle is old, but application is new

By MALCOLM BURTON
McGraw-Hill Washington Bureau

SAFE rail transportation of frozen foods and other perishables requiring 0 deg. F. refrigeration now appears possible, independently of ice and salt and mechanical refrigeration. In a recent test, temperatures low enough to give adequate protection to frozen foods were maintained in a newly developed ammonia refrigerator car for a ten-day test period. During the test, the air temperature outside the car was maintained at about 92 deg. F. and commodity temperature inside the car averaged about 0 deg. F. The car was equipped with a split-absorption refrigeration system charged with liquid anhydrous ammonia—a new use of an old refrigeration principle, which in other applications has proved to be both economical and dependable in its operation. The refrigerator system has no moving parts or power requirements.

The U. S. Department of Agriculture tested the experimental car, furnished by Frigid Transport Corporation, owners of the patents. Birds Eye-Snider Corp., a division of General Foods Corp., furnished a load of frozen tangerine segments for the test. The investigation was carried out in the Fruit Growers Express Co.'s car-testing laboratory at Alexandria, Va.

The test was performed under the direction of H. D. Johnson, Agricultural Transportation Specialist, Marketing Facilities Branch, and D. H. Rose, Senior Physiologist, Bureau of Plant Industry, Soils and Agricultural Engineering, both of the U. S. Department of Agriculture. Those who assisted were G. Clayton Irwin and Harold C. Hopp, Frigid Transport Corp.; J. A. Kortenhoven, North American Car Corp.; A. E. Huff, Birds Eye-Snider, Division of General Foods Corp. and R. W. Patterson, Fruit Growers Express Co.

How the Car Is Refrigerated

The absorption system is one of the older methods of refrigeration. For the purposes of the test, the Frigid Transport Corp. had the system (Fig. 1) installed in a standard 40-ft. refrigerator car, which had approximately three inches of insulation. In the experimental car, the refrigerant, anhydrous ammonia, was delivered to receiver tanks having a capacity of 1,900 lb. Flow of ammonia to the expansion (cooling) coils, located in the ceiling of the car, was controlled by a bulb-type temperature control apparatus, with a range from –5 deg. to 65 deg. F.

Experimental reefer car, equipped with split-absorption refrigeration system using ammonia, which during a ten-day test held a load of frozen tangerine sections at 0 deg. F. and below, in a test house kept at 90 deg. F. to simulate summer conditions.

After passing through a surge tank and expanding at low pressure in the cooling coils, the ammonia passes into the absorber tanks where it is taken up by water. These tanks have an approximate capacity of 750 gal., but are charged with about 500 gal. to allow for expansion as the ammonia enters. Tanks are suspended under the car with clearances within the limits established by the American Association of Railroads.

The expansion or cooling coils were made of 1-in. aluminum tubing, with a coil surface of 865 linear feet. The coils had three fins to the inch, with an outside diameter of two inches. Coils were suspended from the ceiling of the car with eliminator drip pans to carry away excess condensation.

Thermocouples And Thermometers

The experimental car was equipped with 19 thermocouples for reading air and commodity temperatures inside the car. Commodity temperatures were obtained by placing the thermocouples between the cups inside the cartons. In addition, six electric resistance thermometers were used to take the temperature of the air at the top of the load and under the floor racks. Temperature readings are shown in Fig. 3.

The testing laboratory is a small heavily insulated building which will accommodate one refrigerator car (Fig. 2). The building is equipped with heating and cooling apparatus so that any temperature between –20 deg. and 150 deg. F. can be produced and maintained.

Making the Test

The refrigerator system of the experimental car was fully charged with 1,900 lb. of liquid anhydrous ammonia before the car departed from Blue Island, Ill. to Jersey City, N. J. The water absorber tanks were loaded with 500 gal. of water at Jersey City prior to loading the car at the Harborside Cold Storage Warehouse, Jersey City, N. J. The refrigeration system was turned on when loading began. The load consisted of 1,182 40-lb. cartons, each carton containing 36 cups of frozen tangerine segments, gross weight 47,280 lb. "Commodity" temperatures were –5 to –8 deg. F. at the time of loading.

The car was moved from Jersey City to the test house at Alexandria, Va. Temperature readings were taken of the air and com-

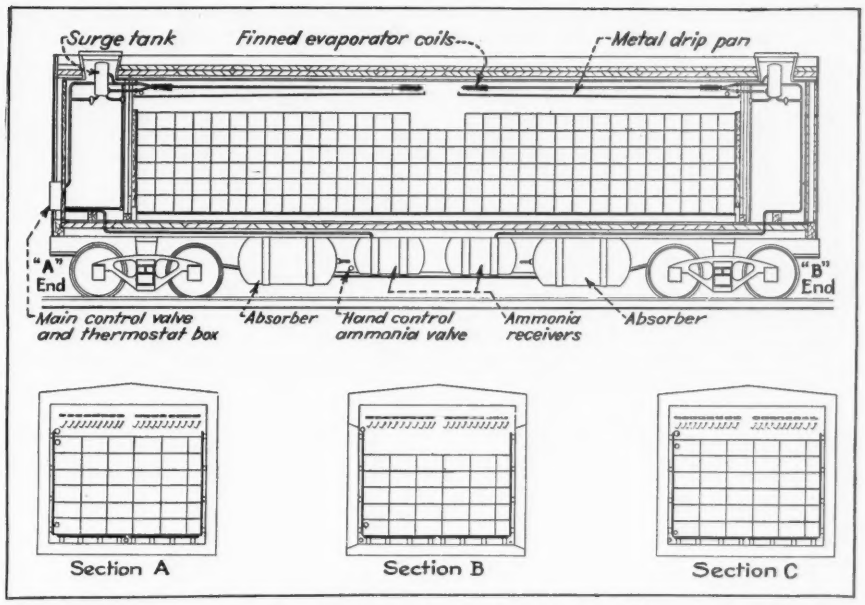


Fig. 1. Diagram shows load in car and cooling system. Tanks hold ammonia under pressure, which flows under automatic control through evaporator coils to absorption tanks.

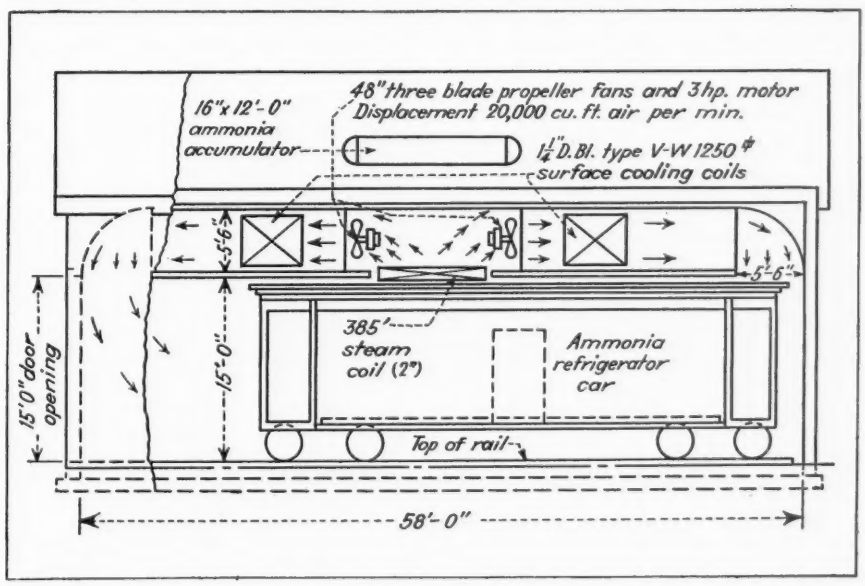


Fig. 2. Car-testing laboratory has standard gage tracks to accommodate a car. Equipment for refrigeration and heating is located in compartment above test chamber.

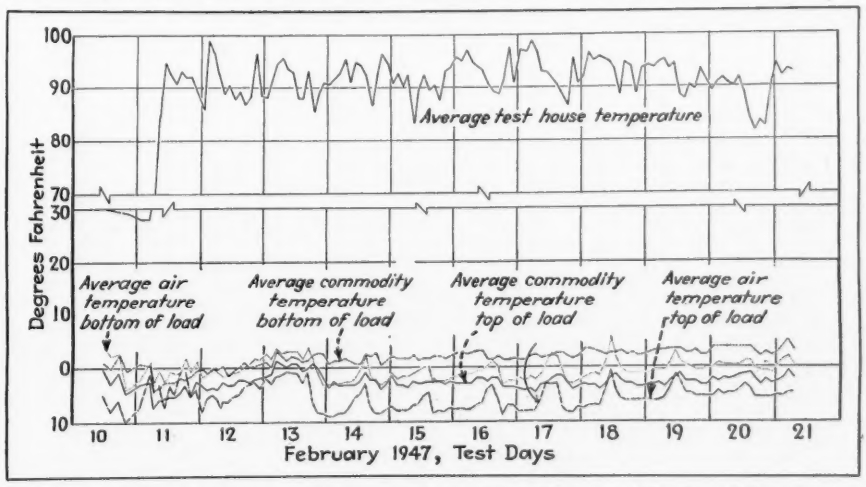
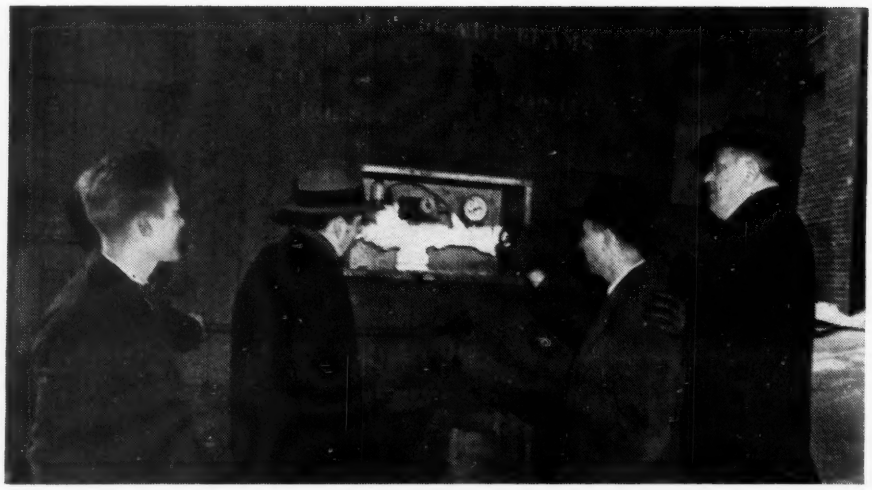


Fig. 3. Average air and commodity temperatures, top and bottom of load, and the average test house temperatures during the time the ammonia refrigerator car was tested.

Photographs and diagrams in this article were supplied by the Production and Marketing Administration, U. S. Department of Agriculture.

Experimental car in Fruit Growers Express Co. test house, Alexandria, Va.

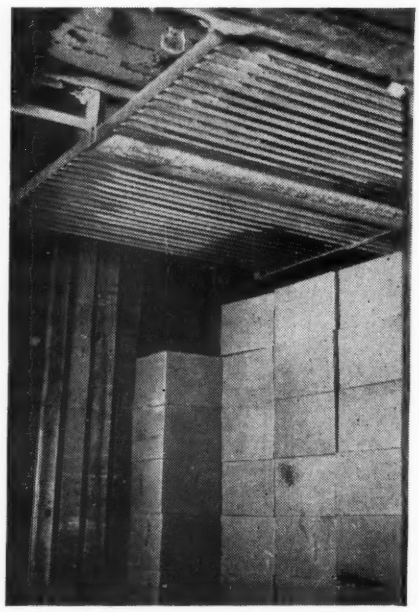


(L. to r.) J. Kortenhoven, N. American Car Corp.; R. W. Patterson, Fruit Growers Express; H. Hopp, Frigid Transport Co., and H. D. Johnson, USDA, inspect refrigerator control unit.

modity inside the car and of the air outside the car at two-hour intervals throughout the 10-day test period, except when the car was in transit to and from the Harborside Cold Storage Warehouse and the test-house at Potomac Yards. At the end of the test period, the load of frozen tangerine segments was discharged still frozen hard and in good condition. Commodity temperatures at the end of the test were 0 degrees to –10 deg. F.

The estimated amount of ammonia used during the test was 11,000 lb. Ammonia-consumption rate was 41.98 lb. per hr. About 5,000 gal. of water were supplied to the car throughout the test. When the absorption tanks were drained, the ammonia-charged water was discarded. With distillation equipment at a service station, ammonia could be recovered.

Under the extreme conditions of the test in which a car with only three inches of insulation was used, the service interval was short. But under normal conditions with a car having six inches of insulation, it would be possible to operate for 56 hours without reservicing and retain 24 hours' service in the refrigerating system as a safety factor.



Refrigerator coils, with frost accumulation, and drip pans in car at the end of test.

The use of this ammonia refrigerator car should not be limited to frozen commodities because it has a temperature control to provide satisfactory conditions for all fresh fruits and vegetables. By the simple addition of an underslung heater with heating coils under the floor racks, a heater-service can be offered which will provide adequate protection for perishables during winter months in addition to refrigeration service for the summer.

Future Plans

Results of the laboratory tests were so satisfactory that a test of the refrigerating system will be made under actual operating conditions on the railroads. Studies of the cost of operation will also be made both of the car and of the service stations. At some future date a scale of charges may be set up by the Interstate Commerce Commission.

Summary of Test

Conclusions of Department of Agriculture officials are:

"Under the conditions of this test, the average top commodity

(*Continued on page* 198)

TABLE I—Anhydrous Ammonia and Water Supplied for Charging and Recharging the Experimental Refrigerator Car During the Ten-day Car-Testing Period.

Location	February 1947 Day	Time charging began	Water supplied, gal.	Anhydrous ammonia supplied, lb.
Blue Island, Ill.	Before exp. was begun		...	1,900
Jersey City	10	9:00 a. m.	500	...
Test house	12	11:45 a. m.	500	...
Test house	12	3:00 p. m.	...	400
Test house	13	1:30 a. m.	...	1,000
Test house	13	6:30 p. m.	500	900
Test house	14	3:30 p. m.	500	1,000
Test house	15	3:30 p. m.	500	1,000
Test house	16	1:30 p. m.	500	1,600*
Test house	17	1:30 p. m.	500	...
Test house	18	11:30 a. m.	500	1,900
Test house	19	11:45 a. m.	500	1,000
Test house	20	11:30 a. m.	500	1,200
Total amount charged into refrigerating system			5,000	11,900

*The system was given a full charge of ammonia at 1:30 p. m., February 16, and was not recharged for 46 hours, at the end of which time the ammonia receiver tanks were practically empty.

Frozen tangerine segments still frozen solid after ten-day test in the refrigerator car.

Continuous Butter Production —A Comparison of Methods

Six well-defined systems of continuous processing may threaten age-old way of churning. These new methods apparently possess many advantages, but they also pose a number of problems in operation and distribution

By F. H. McDOWALL, Chief Chemist
Dairy Research Institute, Massey Agricultural College
Palmerston North, New Zealand

ADVANTAGES claimed for a continuous buttermaking process are that the holding of cream overnight in large holding vats is avoided, the use of the large wooden churns is eliminated and the handling of butter from churn to packer by manual labor is obviated. The labor and operation costs also are claimed to be lower. It will be generally agreed that if these claims can be substantiated, without introducing other disadvantages, some of the weaknesses of the present system of buttermaking will be removed.

These advantages would be more evident in factories receiving whole milk, but in New Zealand this cream is generally handled along with a large bulk of home-separated cream.

Introduction of a continuous system of butter production from cream as received, may have to overcome the following disadvantages as compared with batch churning:

1. Unless the cream is bulked at some stage before conversion to butter the character of the butter will be less uniform.
2. This fluctuation will lead to difficulties in the selection of a sample package for grading and analysis, and in tracking down the sub-standard packages.
3. In New Zealand, packing of butter is carried out in many factories with the same labor used later for the separation of cream. With both processes going forward at once, an economical use of this labor will be difficult.
4. Some of the processes cannot be interrupted without a fair amount of inconvenience.
5. If holding of cream overnight is to be avoided, there would be a considerable amount of night shift work in New Zealand factories in the summer.

The new churning processes of buttermaking are of great interest to all buttermakers, and indeed, to all connected with the butter industry. Authoritative reports based on study of the processes in operation have not yet been published. The present author has been able to see only one of the plants in operation, and that only for a short time. It is his purpose in this article to present some aspects of the processes, and some possible repercussions on the butter industry if present methods are replaced. Final assessment of the value of the new processes will depend, however, on the way they are developed during the next few years.—The Editors.

These disadvantages do not apply to all the processes under consideration, and where they do apply, they are not necessarily cogent, as ways of circumventing them may be developed.

Two Groups of Processes

The continuous processes may be divided into two main groups:

A. Separation methods, i.e., those depending on the re-separation of cream to give a cream of high fat content which is then converted to butter.
   a. The New Way process (Australian)
   b. The Alfa (German) and Alfa-Laval process (Swedish)
   c. The Cherry-Burrell process (U.S.A.)
   d. The Creamery Package process (U.S.A.)

B. Methods involving the churning of cream of normal composition.
   e. The Fritz process (German)
   f. The Senn process (Swiss)

For purposes of comparison the sequence of operations in each of the methods is given in Table I, compared with the sequence for the present method of churning.

Separation Methods

The separation methods fall into two classes: (1) Those involving separation of the cream to slightly over 80 percent fat, viz., the New Way and the Alfa processes, and (2) those involving partial oiling-off of the cream before separation, to permit the production of a cream of 90 to 98 percent fat, viz., the Cherry-Burrell and the Creamery Package processes.

The New Way process, see Fig. 1, calls for collection of the 80 percent cream in a standardizing vat where the composition is controlled. In the Alfa methods[1] light cream is pumped into a second separator which forces it into the "transmutator" or churning machine. Here the butter is made immediately, and composition is controlled by variation of the back pressure on the separator. The Alfa method is thus truly continuous from milk to butter.

The two methods are alike in that the cream is cooled rapidly from 120 deg. F. to a low temperature with agitation, and an inversion of phase takes place, giving a product with the properties of butter. The methods differ in that the New Way uses brine at -5 deg. F. and delivers the butter at 29 deg. F., whereas the Alfa machine (German) uses brine at 24 to 25 deg. F., and the Alfa Laval (Swedish), brine at 35 deg. F. Butter is delivered from the

[1]For information on the operation of the Alfa and Fritz processes see "Continuous Butter Making Successful in Wartime Germany," Food Industries, June, 1946.

TABLE I—Sequence of Operations of Butter Making Processes.

(a) New Way	(b) Alfa	(c) Cherry-Burrell	(d) Creamery Package	(e) Fritz	(f) Senn	Ordinary Churning
Milk	Milk	Cream	Cream	Cream	Cream	Cream
35% cream	Cream 25-35%	Neutralizing vat	Pasteurized cream at 170 deg. F.	Pasteurized cream	Pasteurized cream	Pasteurized cream
Pasteurized cream	Pasteurized cream	Agitator heater	Separation to 75-80% fat	Cooled cream stood overnight	Cooled cream allowed to stand overnight	Cooled cream allowed to stand overnight
Cream at 120°-140°F.	Cream at 120°-140°F.	Separation to 85-90% fat	Emulsion breaker			
Cream 80% fat	Cream 80% fat	Vacreated cream	Gravity separation of serum yielding product of 98% fat			
Standardizing vat		Standardizing vats	Composition control pump			
Cream of standard composition		Cream of standard composition	Standardized mixture at 140-150°F.			
New Way machine-brine at —5°F.	Alfa machine brine at 24-25°F.	Butter chiller Texturator	Butter chiller	Fritz machine	Senn apparatus	Churn
Butter at 29°F.	Butter at 59°F.		Butter extruded at 45-55°F.	Butter in thin ribbons continuously—plus buttermilk	Cream churned in small portions—up to 20 gal. at a time in CO_2	Butter plus buttermilk
Molded butter	Butter packed by liquid packing	Molded butter			Molded butter	Molded butter
Capacity 1,000 lb./hr.	Capacity 500-600 lb./hr.	Capacity 1 ton per hr.	Capacity not specified	Capacity up to 2 tons per hr.	Capacity 1,000-2,000 lb./hr.	Capacity 1-1¼ tons per hr.

Alfa machines at 54 to 60 deg. F. The New Way machine is attached to a special butter molder which packs the butter immediately after it is extruded. The butter from the Alfa machine is in a semi-liquid form and is run into the final container through a tube. It is consolidated in the container by means of a vibrator, and hardens within a few hours.

Using Partially Oiled-Off Cream

The Cherry-Burrell process[2] specifies passage of the cream through an agitator heater, which causes partial oiling-off and brings the cream to a suitable temperature for separation. The cream, of fat content up to 90 percent, is then treated in a Vacreator and transferred to standardizing vats. The standardized product is passed through a chiller and texturator to the butter molding or packing machine.

In the Creamery Package process[2] the pasteurized normal cream is separated to cream of high fat content. This cream is passed through an emulsion breaker where it is transformed to a freely separable mixture of fat and serum. The serum is separated by gravity and the fatty portion passes, via a composition control pump, to a chiller and butter-extruding tube.

Physical Quality of Butter

It will be noted that New Way butter is fully chilled when packed, and Alfa butter is semi-liquid. Each of these properties has repercussions on present dairy practice. Normally, in New Zealand, butter is cooled only to chill temperature before it reaches the export grading store. Butter at 31 deg. F. would require thawing for one or two days before it could be graded. This thawing would have to be done at the factory, as early grading at the grade store is essential so that the boxes can be marked with the appropriate grade, and the second grade boxes segregated before the stack in the store becomes covered with new shipments.

Alfa butter at 59 deg. F. could not be handled very easily in soft fiberboard containers, and even in wooden boxes may require two days' chilling before shipment in the summer, to prevent loss of quality during transport. This would involve enlargement of some butter chill-rooms to take at least 4 days' production in the flush period. Butter prepared by the Cherry-Burrell and Creamery Package processes is in suitable condition for packing in butter-patting or molding machines.

Composition of Butters

There is no washing with butter wash-water, but the composition of the butters from the Class 1 separation processes will be different from that of Class 2. Butters from Class 1, with a moisture content of 16 percent, may have a curd content as high as 1.5 to 1.6 percent. Butters from Class 2 will include only small amounts of curd, unless the standardization is carried out with skim milk. Control of composition in the New Way, Cherry-Burrell and Creamery Package processes is carried out on indi-

[2]For information on the Cherry-Burrell and Creamery Package processes see "Recent Developments in Continuous Butter Making," Food Industries, December, 1946.

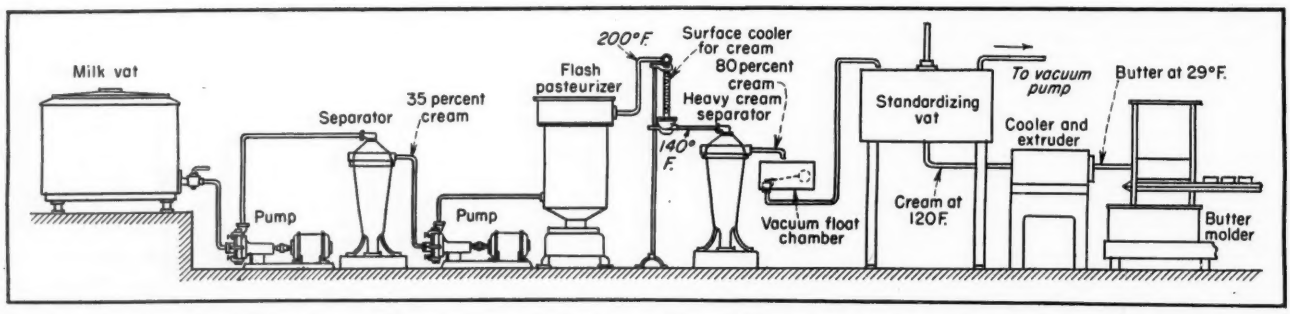


Fig. 1. In the New Way Process for making butter continuously, milk, as it is received from the farm, is separated to give 35 percent cream. This cream is flash pasteurized at 200 deg. F., cooled over a surface cooler to 140 deg. F. and fed to a special separator. The resulting cream, testing above 80 percent fat, is drawn into a vat and standardized. It then passes into the New Way machine, where it is cooled with brine at —5 deg. F., undergoes a phase reversion and is extruded as butter at about 29 deg. F.

vidual batches of concentrated cream, and great accuracy should be possible. The author is not cognizant of the various problems of composition control of the butter made by the Alfa process.

Salting of Butter

Statements have been made that the butters can be salted by the addition of brine to the 80 percent cream, but simple arithmetic makes it clear that this is not possible. Addition of brine to give the New Zealand maximum of 2 percent salt would mean the addition of 6 parts of water. Figures for composition of butters salted with brine, for different percentage fat contents in the cream, and for different salt contents in the butter, are given in Table II.

It will be seen that, to get a salt content of 1.33 percent in the butter, and a moisture content below 16 percent, it would be necessary to work with cream of 86 percent fat. Since saturation with salt precipitates some curd in milk, the salt would have to be dissolved in water before addition and this would mean a reduction in the curd content to 1.16, thus eliminating a portion of the higher yield claimed.

In the cream separation, even to 80 percent fat, the fat globules have to be forced to lose their spherical shape. If production of a cream of 86 percent fat is commercially possible, it would be obtained only by great sacrifice in separator capacity. The principle adopted in the Cherry-Burrell and Creamery Package patents, of partially oiling-off the cream before the second separation, is apparently designed to overcome this difficulty.

The problem is overcome in the Swedish Alfa process by use of a device for continuous addition of dry salt to the heavy cream before it is passed to the transmutator. Even with use of dry salt, however, it is necessary to have a cream of 81.6 percent fat if 2 percent salt is to be incorporated without reducing the fat content below 80.0 percent, the minimum permissible in most countries. Dry salt can be added to the cream in the New Way standardizing vat, and the high fat content of the partially oiled-off cream in the Cherry-Burrell and Creamery Package processes makes composition control by means of brine readily possible.

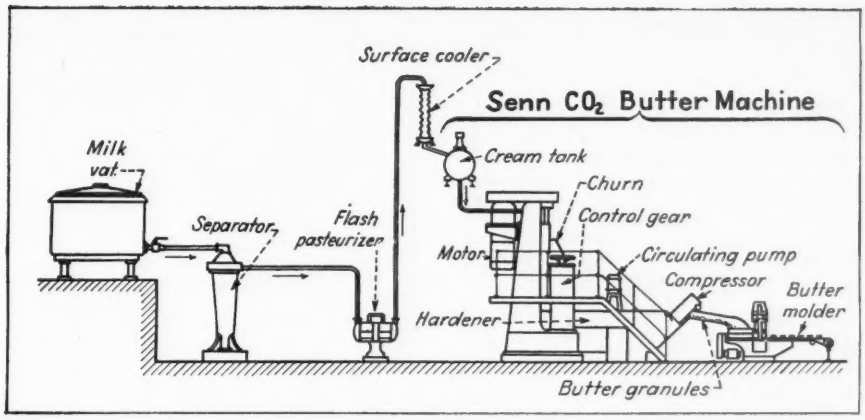


Fig. 2. In the Senn continuous butter-making process, the freshly separated cream is forced from the cream tank, by CO_2 under pressure, into the churn, where it is converted into butter in 1 to 1½ min. The butter granules are washed, once in the churn and twice in the hardener, then worked in the compressor and forced into the molding machine.

Original Cost

It is difficult to assess the costs for the new processes on the information available. The separation processes may eliminate cream coolers, holding vats, wooden churns and the butter wash-water tank and coils. There would probably be a saving in building space required.

Provision of brine at –5 deg. F. for the New Way process would be a heavy load on the refrigeration equipment. Although the main cooling load in the separation processes falls on the refrigeration equipment, it is balanced by three factors: (a) Smaller demand for water for cooling purposes; (b) the volume of cream to be cooled is smaller, and (c) the cost of cooling butter wash-water is eliminated. It seems likely that in the Alfa and Cherry-Burrell systems, the total cost of refrigeration would not be greater than for the present system.

In the Alfa, New Way and Creamery Package processes, pasteurization takes place before separation of heavy cream, and there is no saving in fuel, but in the Cherry-Burrell process, the cream is not treated till after final separation. This should reduce steam consumption, permit a slower flow of cream and a more complete removal of undesirable flavors.

The extent of the saving in labor is difficult to estimate. The cost of cleaning operations should certainly be lower due to the elimination of holding tanks and long pipe lines.

Fat Losses and Butter Yield

The fat losses in the separation from 40 to 80 percent cream are very low, and all the separation processes would therefore result in a much greater fat recovery than the present method. A greater yield is obtained with the New Way and Alfa processes also through the presence of more curd in the butter. A composition of: Moisture 15.90; curd 1.50 and salt 1.80; total 19.20, would yield butter with a fat content of 80.80 instead of the present New Zealand average of 81.95 percent. There would thus be a saving of (say) 0.8 percent of the fat through reduction in losses, and an increase in returns through higher overrun equivalent to at least a further 1.7 percent, giving a 2.5 percent over-all increase in yield. If all the other factors, especially butter quality, were satisfactory, this increase in yield would make the acceptance of any disadvantages of the new processes economically well worth while.

Properties of Butters

Reports indicate that both New Way and Alfa butters, when well made are of excellent body and texture when cool, but have a some-

TABLE II—Butter Compositions.

Fat in cream, percent	Salt in butter, percent	Composition of Butter		
		Water, percent	Curd, percent	Fat, percent
80	1.33	21.25	1.67	75.76
84	1.33	17.79	1.34	79.94
86	1.33	16.07	1.16	81.44
88	1.33	14.34	1.00	83.33
80	1.68	22.05	1.64	74.63
84	1.68	18.65	1.32	78.36
86	1.68	16.95	1.15	80.22
88	1.68	15.24	0.99	82.09
80	1.85	22.44	1.63	74.07
84	1.85	19.06	1.31	77.78
86	1.85	17.37	1.14	79.63
88	1.85	15.68	0.98	81.48
80	2.02	22.83	1.62	73.53
84	2.02	19.48	1.30	77.21
86	2.02	17.80	1.13	79.04
88	2.02	16.12	0.97	80.88

what vaseline-like or oily appearance at warm temperatures. It is open to question whether the desired crystallization can be obtained with the rapid cooling given in the new machines. The effect of the partial oiling-off of the cream, in the Cherry-Burrell and Creamery Package processes, on the butter quality has not been fully reported. No doubt a considerable amount of re-emulsification takes place during Vacreation, but it is not known whether this will restore the cream to its original quality.

The butters have a very even water distribution, which should retard bacterial growth, and they are almost free from air, which thus reduces the volume per pound. This would be an advantage from the point of view of cost of transport, but would not necessarily be approved by the consumer.

Direct Churning Processes

The Fritz Process[1]. The Fritz butter is reported to have a good body at low temperatures, but becomes spongy and weak when warm. In the working process the butter takes up a considerable amount of air (ordinary butter made in New Zealand contains 4 to 8 percent by volume). Apart from the question of air content, the butter should be similar in character to normally churned butter, as the cooling is slow, and the storage of cream in the holding vats would give an opportunity for controlling the crystallization.

In view of the limited information available on the Senn CO_2 buttermaking process, FOOD INDUSTRIES arranged for Michael Marsh, McGraw-Hill World News correspondent in Paris, to visit the factory of Escher-Wyss Maschinenbau A.G., Zurich, Switzerland, which has been building the Senn equipment. Mr. Marsh reports that three new machines, each with a capacity of one ton of butter per hour, are under construction. One is for an Australian firm, one for a New Zealand concern and the other was still for sale at the time of the visit. The photograph of the Senn apparatus, and the flow sheet of the Senn process, were obtained by Mr. Marsh for McGraw-Hill World News.

Control of butter composition would appear to be the principal weakness of the Fritz process. As the buttermilk is pressed from the butter grain by the working screws the extent of buttermilk expulsion is dependent on: (a) The fat content of the cream churned—a high fat content in the cream gives a high moisture content in the butter; (b) the temperature of the cream; (c) the speed of passage of the cream to the churn; (d) the size of the slit opening in the worker.

The adjustment of (d) gives a small range of control, but the main control is through variation of (a) and (c). For any one setting it is essential to have cream of the same composition and at the same temperature. It is then necessary each day to make a trial analysis immediately churning of each vat of cream is commenced, and to modify the conditions accordingly.

It is not clear how the butter could be salted. The suggestion has been made that it could be brine salted, but the granules would have to contain 86 to 88 percent of fat before this would be possible, unless some of the water is expelled during the salting, in which case extra salt would have to be added.

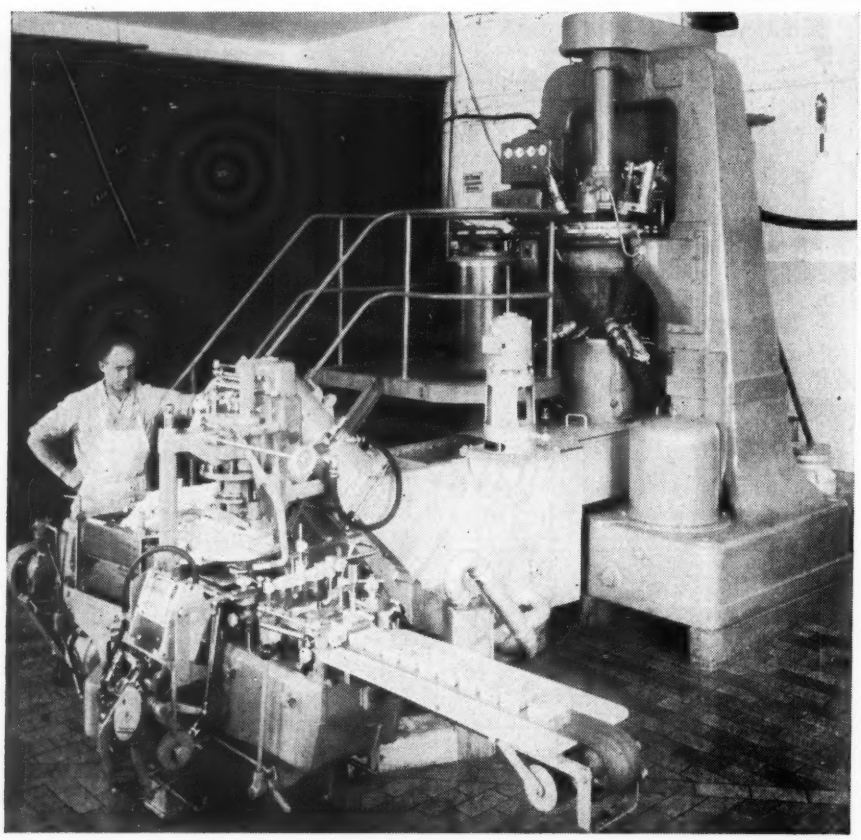
The butter is extruded from the machine directly into a packer, and packed as at present. If the air content is not reducible, the volume of the 56-lb. box would be considerably greater than the volume of the present 56-lb. box. The machine would be more easily and cheaply cleaned than present churns.

Costs and Convenience

Except for the trouble in adjustment of the machine each day, or perhaps for each holding vat of cream, the Fritz process appears to be simple in operation, and the output of the largest model, 2 tons per hour, is greater than that of any churns at present available. This capacity would be sufficient to keep a small packing gang working steadily, and one or two machines would make it possible to churn the butter in the morning before reception of cream, except during the flush of the season. The butter would be disposed of without heavy labor of handling on trolleys and tables, and without exposure to light and heat of the atmosphere. Costs for power and upkeep are likely to be much lower than for the present system of churning.[3]

The Senn Process. Pasteurized and cooled cream is forced under carbon dioxide pressure into a chamber of 20 to 25 (in the latest machine, of 50 to 60 gal.) capacity, where it is subjected to powerful whipping by mechanical agitation, and is converted into butter granules in 1 to 1½ min. The granules

(*Continued on page* 208)



The Senn CO_2 churning apparatus converts freshly separated 30 percent cream into butter in 1 to 1½ minutes. It is operated by one man, who controls a cycle of operations (approximately 5 minutes) for each batch of cream drawn into the machine.

[3]The American Butter Institute has recently reported on a trial of the Roth modification of the Fritz buttermaking machine to the effect that, in its present form, the machine is not practicable for use in the American butter industry because of the high butterfat losses and because of difficulty in control of butter composition.

A. K. Balls enjoys a luncheon chat with Ruth Adamy and Bernadine Meyer.

Clarence Birdseye helps Paul Logan and Mrs. C. P. McCormick register.

Emil Mrak gets his identification badge from Mrs. J. A. White.

IFT Homecoming at Boston

Birthplace of the Institute entertains 700 IFTers attending the seventh annual conference. Program features the relationship of food technology to company management, the Food Industries Award, and fishery products

FOOD INDUSTRIES Editorial Staff Report

EMPHASIS on the relation of food technology to company management was a feature of the seventh annual conference of the Institute of Food Technologists in Boston last month. In line with this recognition of the overall importance of food company policy and activities was the presentation of the Food Industries Achievement Award, a distinction in which the company, rather than the individual, is recognized.

Holding of the meeting in Boston was regarded as a homecoming for the Institute, and it was so marked by Dean S. C. Prescott, who spoke at the opening session. Dean Prescott noted that the first food conference was sponsored by Massachusetts Institute of Technology ten years ago.

Programs of the four-day meeting were arranged to give prominence to the new conference features and also to take advantage of the Boston setting. The first full day, Monday, was devoted to the management and management-relationships theme, with company officials and research directors among the speakers. The IFT Achievement Award was presented to the Atlantic Coast Fisheries Company at a special luncheon.

In compliment in part to the New England section, one of the morning technical programs was set aside for a discussion of fish technology and processing problems. Fish plants were among the industries of the Boston area holding open house for the delegates. An afternoon and evening were set aside for a trip to Gloucester, which included a clambake and lobster shore dinner.

Symposium on Colloids

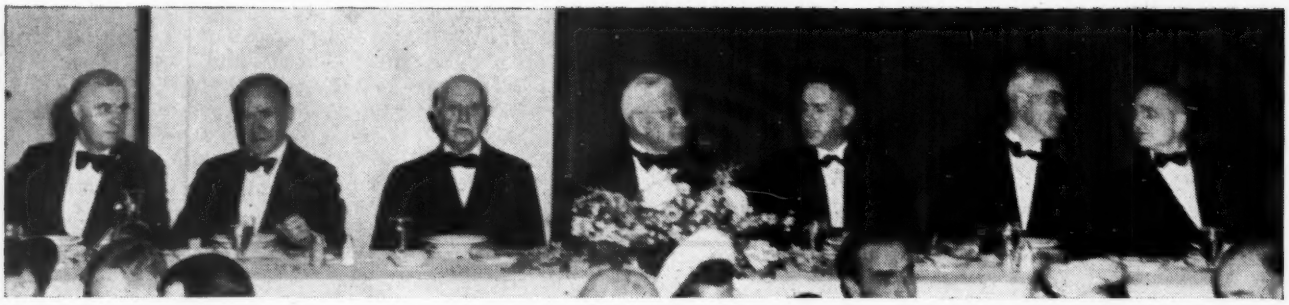
One of the most provocative technical sessions of the meeting proved to be the symposium on the opening night on applications of colloid chemistry in food processing. The symposium took the form of a lecture on colloid chemistry by Dr. Ernst Hauser, world authority on colloids, followed by a question and answer period conducted by the chairman, Robert S. Scull, of the convention programs committee. Dr. Hauser is best known for his work in the fields of rubber and clay, from which he drew a number of illustrations for his lecture.

Current interest among food technologists in colloidal applications was indicated by the full attendance of more than 200 of the early arrivals, of whom a dozen or more took part in the discussion. Some of the participants amplified Dr. Hauser's examples of colloidal applications, and others took a stand somewhat at variance with his theories. All, however, brought out the central position occupied by colloidal materials in the products and processes with which the food technologist has to deal.

Dr. Hauser, who is professor of chemical engineering, Massachusetts Institute of Technology, defined a colloidal particle as "any exposed particle where the surface is preponderant in comparison with its volume." Materials in this range, usually of submicroscopic size, are highly reactive, may be unstable, and frequently involve the problem of particle coalescence or coagulation.

Typical colloidal problems with which the food technologist has to deal include the making of emulsions, usually with the aid of an emulsifying agent; formation of gels; use of chemical detergents; the processes of digestion, especially of fats; materials in the form of foam, which may include everything from the froth on beer to the recovery of protein waste from starch manufacturing.

Manufacture of mayonnaise is a typical processing problem which depends on the theory of emulsions. In order to make a stable emulsion of two immiscible liquids, it is necessary to coat the particles of one of the liquids if they are to remain



The head table at the banquet starts with president-elect George J. Hucker, at the left. He is followed by W. V. Cruess, E. M. Chace, L. V. Burton, B. E. Proctor, G. R. Harrison, the guest speaker, and retiring president Ellery H. Harvey, whose face is hidden in the

suspended in the other liquid. This is where the emulsifying agent comes in, Dr. Hauser pointed out. Reducing the problem to simple terms, an emulsifier like sodium oleate would favor an oil-in-water emulsion. Calcium oleate, on the other hand, would tend to favor a water-in-oil emulsion. Where homogenization is resorted to, the smaller particle size resulting tends to favor stability. The relatively greater surface area, however, means that more emulsifying agent must be available, despite the homogenization.

Dairy experts pointed out that in natural milk only about two percent of the natural emulsifying agent is active. Following emulsification, however, about ten times as much of the natural emulsifying agent is brought into play.

In the case of chemical detergents, the theory was advanced that phosphate ions are added to contaminating particles, which become highly charged and thus easily separated from a glass or metal surface.

Many of the questions directed at Dr. Hauser had to do with the emulsifying properties of eggs before and after storage. Questions were asked also about the new synthetic emulsifying aids for use in ice cream.

Chairman Scull, who was able to elicit questions from virtually every field of the food industry, suggested that colloidal problems be discussed at sectional meetings in the forthcoming year, then placed on a panel program for consideration at the next convention.

President's Address

In his address opening the convention, Dr. E. H. Harvey, retiring president, cited the three great trends that have influenced the food

Mathematics, Research and H. F. Cooking on Banquet Program

Progress in food technology in three different ways was foreshadowed at the annual banquet of the Institute, which was attended by nearly all of the 700 registered at the meeting. One of the prospective developments, in the technic of applied research, was outlined by Dr. C. O. Ball, the 1947 Nicholas Appert Medalist. Other developments, in basic food research, were seen on the horizon by Dean G. R. Harrison, of M.I.T., the guest speaker. Finally, an intriguing trend in hotel and restaurant cooking was evident in an elaborate demonstration of ultra-high frequency heating.

In addition to the speakers, those at the head table included the 1947 officers, past presidents and the newly elected officers. Ellery Harvey, retiring president, acted as toastmaster. The Appert medal, offered annually by the Chicago section of IFT, was presented by the past chairman of the section, John T. Knowles. He reviewed the career and achievements of the recipient.

In accepting the medal, Dr. Ball read an essay on the use of mathematics in research, explaining how mathematical analysis may eventually make a great deal of laboratory experimentation needless. Using illustrations in his own special field of heat sterilization, he showed how correct mathematical analysis of a present-day practical problem can reduce tedious laboratory work to a twentieth of that thought needed.

Pointing out that mathematics is the fundamental measuring instrument of science, Dr. Ball predicted that, in time, "inductive rationalization" will take the place of much present day experimental investigation of biological problems. Direct application is possible now in the case of factors affecting the simplest biological structure, the bacteriological cell. In the study of sterilization processes, the factors may be the time and intensity of heat applied to kill bacteria. How can one determine the critical point—the point at which the most resistant organism, capable of spoiling the food, is destroyed?

In a practical application, two curves are involved. One is the heat-penetration curve, a time-and-temperature curve. The other is the thermal death time curve, also a time-and-temperature curve. From these two curves one finds out how long to process food to preserve it.

A research problem may involve five possible types of containers, processed at three different temperatures. A correct analysis of this type of problem will reduce the experimental work 96 percent.

That food technology is a matter of the distribution of energy was the novel concept thrown out by Dean G. R. Harrison, who told the assembled food technologists that they are primarily concerned with the packaging, storing and distribution of energy in special forms—"even in the case of a box of strawberries."

Enlarging on the energy theme, the speaker reviewed the sources and utilization of energy, from the use of wood to the development of atomic power, working into his discussion the consumption for energy purposes of a pound of butter. Know-how, slowly acquired over the years, is the essential element.

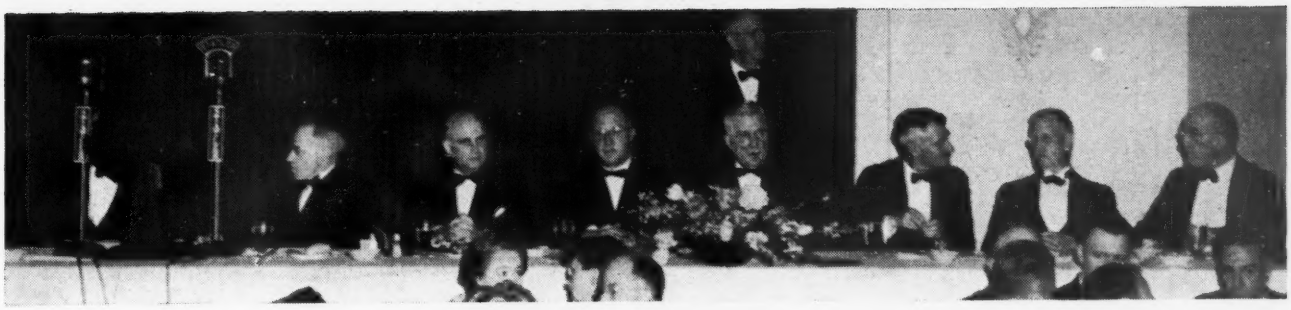
In the synthetic production of sugar for human energy, additional know-how would avoid the situation of yields amounting to only a few percent, with most of the organic molecules put together wrongly. Here additional know-how about enzyme action would aid, since enzymes can exert a control in such a process that is not yet available to mankind.

Stressing the unity of all science, Dean Harrison mentioned the possible utilization of cosmic rays in genetics, for the modification or production of new species. In these and similar investigations, he reminded his audience, science and technology are no longer impecunious, but are in a position to command large resources for the prosecution of research.

The most unusual feature of the banquet program was Raytheon's demonstration of its Radarange, ultra-high frequency cooking device. For a description of this equipment, see FOOD INDUSTRIES, August 1946.

Among new applications of the radar equipment are the cooking of whole, live lobsters and the popping of pop corn on the cob, sealed in a transparent bag.

The Raytheon organization is not yet contemplating units for the consumer's kitchen, but is going ahead with commercial units. The company is working at the present time with several manufacturers of precooked frozen plate meals, where the radar equipment will be used for defrosting and heating the plate meal. Interest in the development on the part of all those at the dinner was indicated by the throng on the stage after the demonstration.



shot of the right side of the same table, at which are, in the same order: C. O. Ball, J. T. Knowles, H. C. Diehl, E. S. Stateler, C. R. Fellers, S. C. Prescott and F. C. Blanck. Dr. Ball received the Nicholas Appert medal, awarded annually by the Chicago Section.

processing industry since the turn of the century. First was the passage of agricultural products through processing plants instead of direct from the farm to the consumer. The next phase was brought about by developments in nutrition, which shifted emphasis from mere preservation, to conservation of vitamins and minerals. Finally there is the present phase, he said, in which it is becoming more and more fully recognized that there are basic processes that cover widely diversified fields in the industry.

Technology and Management

The first general session on "Food Technology in Relation to Management" was placed in the hands of two of the food industry's younger executives, Philip W. Pillsbury, president of Pillsbury Mills, and C. P. McCormick, president of McCormick & Co., Baltimore. L. F. Whittemore, president of the Federal Reserve Bank, Boston, also spoke at this session, which was presided over by S. C. Prescott, chairman of the Northeast Section arrangements committee and recognized as "father of the IFT."

Mr. Pillsbury, in speaking on "The Relation of Technology to Company Management," lamented the fact that management is often too greatly influenced by day to day profits, and thus loses sight of the value of long range programs based on research. Expenditures for research, he said, should not be tied to a percentage of sales. Management should recognize that research is the heart of the organization and should be considered apart from the operational functions. Not only must management be sold on research, he added, but management must sell it to the stockholders. In this there is a long way to go and the food technologist can assist by supplying the materials through which the value and stability of long range profits can be demonstrated to stockholders.

Speaking in the same general vein, Mr. Whittemore observed that the value of research should be easy to sell in a country where its value has so recently been demonstrated and where communication is so complete.

In noting that "Good human relations pay dividends," Mr. McCormick observed that thinking straight was one of the most important and one of the most difficult considerations. In any dispute or any difference of opinion it is always possible that all sides are wrong. A new machine, he said, is bought only after long and careful examination and testing. Yet, a plant may hire 100,000 workers with little thought of the individuals making up that group. The one way to learn about people is to get to know them and their problems by going into the plant and working with them, trying to live on their wages and to learn something of their hopes and fears, particularly their fears. There has been one important change in private enterprise, he said, since the Pilgrims landed on these shores 300 years ago, speaking of the dignity of man. This great change has been in profit sharing. And from this change possibly springs the loss of dignity that is so manifest in 1947 through our strikes, distrust and political doctrines.

Mr. McCormick said he was confident that all the rank and file of labor wanted was a return to that lost conception of dignity. Absence of fear, through security and well being in his job, will carry much further than the unwarranted demands of many labor leaders. And abandonment of the conception of a boss in favor of that of trusteeship will solve much of the present strife. In this respect he pointed to the great advantages enjoyed by technical men in the plant. Because a man with a degree is looked up to by other workers he is in a position to develop understanding and trust between labor and management.

The operation of a research department requires a great deal of organization and planning if the experts in various fields are to function as a team, in the opinion of Louis E. McCauley, vice-president, Armour & Co. His talk opened the Monday afternoon session on research and development management, which was presided over by H. C. Diehl, director of the Refrigeration Research Foundation.

Such a department, Mr. McCauley said, must have a competent director and a well chosen staff, receiving adequate compensation. The staff must also be given adequate facilities and a free hand in conducting its own activities under its own executive officer.

Cost of Research

Thomas M. Rector, vice-president, General Foods, discussed methods of obtaining the costs of research projects. He said that the overall cost may be roughly computed on a basis of $6,000 per year per person. About two-thirds of the cost will go for payroll, the remainder for fixed expenses. About 40 percent of the payroll should be paid to technically trained members of the staff and 60 percent to the non-technical. A simplified cost card that can be filled out in less than a minute accompanies each project. This card gives the accounting department all the information needed to keep the operation under good financial control. From these financial reports the laboratory director can learn how closely the staff is conforming to the planned program. The research director can also use them to point to profits from new products or increased sales from improved old products.

The only real solution for an industrial company that is genuinely interested in research is to set up a research department, even if it is comprised of only one man. This was the contention of W. L. Campbell, professor of food technology, M. I. T. Additions can be made, he said, to the results obtained by this department by contact with outside

E. H. Cooley, president, Atlantic Coast Fisheries, exhibits award plaque. From left: B. E. Proctor, Mr. Cooley, M. A. Williamson, L. V. Burton and E. H. Harvey.

agencies, such as commercial research labs, research institutes and research departments of universities. In this way even the smallest research department gains the use of facilities and personnel that a limited budget would not otherwise permit.

Sanitation

The Tuesday morning session on sanitation in food handling and storage, under the chairmanship of George Garnatz, Kroger Food Foundation, Cincinnati, was opened by H. C. Diehl, who read a paper on recent developments in transportation and storage of raw materials for processing, by W. T. Pentzer, USDA, division of fruit and vegetable crops and diseases. Mr. Pentzer took cognizance of the heat given off by fruits and vegetables when stored at 60 deg., which he cited as both a factor in spoilage and an indication of the chemical changes that lower the quality of the product. He recommended either immediate processing, after harvesting, or at least the best possible refrigeration, if immediate processing is not feasible. Water-cooling at the field was suggested, as were liberal uses of crushed ice and other methods of treatment.

How the Quartermaster Corps approached the thermophilic spoilage problem was told by Hatton B. Rogers, Jr., director of quality control, Phillips Packing Co., Cambridge, Md. He described how the QMC used its mobile laboratory units to detect contamination in food plants, thus enabling the canner to prevent millions of dollars worth of spoilage in canned non-acid vegetables due to thermophilic bacteria. He also described a unit that used a battery of ultraviolet lamps to destroy thermophilic spores in sugar, which had been found to be a source of such contamination.

A. L. Sotier and Dwight B. Conklin, research department, Wyandotte Chemicals Corp., emphasized the necessity of including hand sanitizing treatments as part of the food handler's preparation for work. This can be done with the use of a commercially available chlorine releasing germicide, Chloramine T, either in combination with soap or after using soap. Tests made in the poultry dressing industry indicated the effectiveness of a 3 to 1 soap-germicide powder. While it is practically impossible to actually sterilize the hands, use of the surgeon's scrub technic will reduce the bacteria count by about 50 percent for each six minutes of scrubbing. The nonirritating germicide can be dispensed from soap dispensers either alone or in combination with soap powder.

Improvements in food plant sanitation in California, as the result of surveys and a sanitation program, were reported by K. F. Meyer, George William Hooper Foundation, University of California. Surveys made in 1945 revealed sanitation to be at a low ebb, due to wartime pressures, labor short-

F.I. Achievement Award

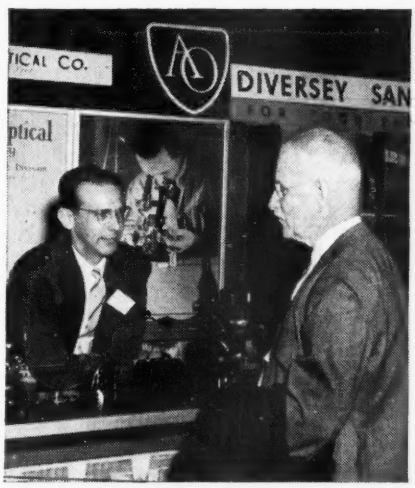
In presenting the first biennial Food Industries Achievement Award to E. H. Cooley, president, Atlantic Coast Fisheries, L. V. Burton, editor of the publication, paid tribute to award jury and its chairman, B. E. Proctor, for its accomplishment of a difficult task. He particularly noted the problems involved in appraising different developments and in comparing the industrial value of a machine with that of a process. He also urged future candidates to remember that the information they presented would be appraised by a jury of technical men and that it should, therefore, be prepared by a technical staff.

Professor Proctor outlined the merits of the fish filleting machine, which the jury of fifteen had adjudged the outstanding development in the food field during the war and postwar years. He lamented the fact that only the winning achievement could be mentioned, as there were a number of developments regarded as highly meritorious. He also extended the thanks of the award jury to M. A. Williamson, publisher of Food Industries, for making the award possible.

Mr. Cooley, in his acceptance, assured the luncheon group that his company will continue with its technological developments in the food field. He called attention to two machines now being perfected, one to fillet flat fish and another that will cut two attached fillets, known as butterfly fillets. He paid tribute to the company's technical staff and in particular, W. A. Ellison, Jr., manager of the machine division, and Charles M. Savrda, coinventor. Neither Mr. Ellison nor Mr. Savrda could be present as they are now in England.

The head table at the F. I. achievement award luncheon, on the first day of the convention. From left: M. A. Williamson, publisher of Food Industries; Col. S. C. Lawrence, C. R. Fellers, B. E. Proctor, chairman of the award jury; E. H. Cooley, president, Atlantic Coast Fisheries; E. H. Harvey, L. V. Burton, C. P. McCormick, G. J. Hucker, S. C. Prescott and A. C. Fay.

The opening panel, above, on management and human relations, included E. H. Harvey, C. P. McCormick, Philip W. Pillsbury and S. C. Prescott. Below: H. C. Diehl, T. M. Rector, L. E. McCauley, and W. L. Campbell, while at the upper right J. J. Karrh, L. Seymour-Jones, Aksel Olsen and N. W. Kempf solve some minor problems. Lower right: S. C. Prescott, B. E. Proctor and A. F. Stevenson rest a moment between sessions on the opening day of the busy four-day schedule arranged by the program committee.

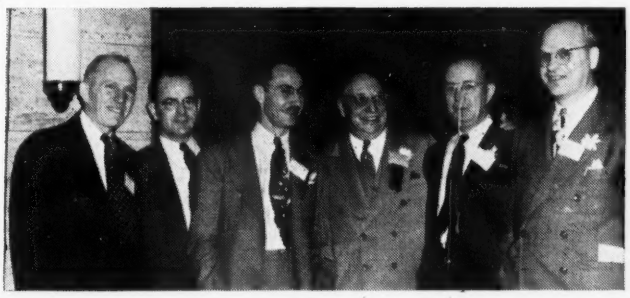


At left, S. C. Prescott extends welcome of Northeast section to an exhibitor.

Some equipment problems were solved at this session.

Left: The Atlantic Coast Fisheries enjoy the achievement award luncheon at a group table.

Alfred L. Sotier and George Garnatz prepare for session on sanitation.



Gorton-Pew greets Armour's. From left: Vic Conquest, H. J. Reynolds, B. M. Shinn, M. P. Vucassovich, R. R. Fulton, C. K. Wiesman.

Facing camera from left are: H. L. A. Tarr, Ernest Hess, Berton S. Clark and Karl F. Meyer, at a banquet table.

The newly elected officers were caught at the banquet with the retiring president. From left: C. R. Fellers, secretary-treasurer; G. J. Hucker, president; E. M. Chace, vice-president, and E. H. Harvey, this year's leader. President Hucker moves up from secretary's post.

The officers elected to lead IFT through the coming year are:

President.....G. J. Hucker
Vice-President.....E. M. Chace
Secretary-Treasurer....C. R. Fellers

Councilors-at-Large

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ages, and worn equipment. The program, set up at that time, featured revised health and sanitation surveys. The National Canners Association and the University of California joined forces in training sanitation experts and in developing standards and technics for food plant sanitation. This new program has not only safeguarded public health, but has also resulted in the increased production of better foods and in reduced spoilage.

Processing Sanitation

Processing sanitation took up the Tuesday afternoon session, under the chairmanship of J. L. Hileman, Dairymen's League Co-op. Association, Inc., Syracuse, N. Y.

In opening this session, Richard C. Cunningham, chief metallurgist, Industrial Steels, Inc., Cambridge, Mass., discussed stainless steels. Of the 28 separate alloys recognized as stainless steel, he said, only four meet all the problems in food processing. Fabrication of stainless steels is now comparatively easy. Unlike copper and some other metals, stainless does not affect the color or flavor of foods.

A variety of tests used to evaluate food plant detergents were offered by H. A. Trebler and H. G. Harding, research laboratories, National Dairy Products Corp., Baltimore. Findings on specific substances were presented in tabular form, which also showed comparative costs.

In a two-part discussion on how to improve sanitary control through equipment design, E. H. Parfitt, Sanitary Standards Dept., Evaporated Milk Association, Chicago, discussed equipment dairy products and liquid foods, and H. E. Kingman, Jr., Wilson & Co., spoke for meats and meat products.

Mr. Parfitt outlined the so-called 3A sanitary standards program, formulated by the International Association of Milk Sanitarians, the U. S. Public Health Service and the Dairy Industry Committee. These standards, he explained, have been established for fittings for pipe lines, thermometers and milk storage tanks. They are also being formulated for milk transportation trucks, milking machines, pails, strainers, drop tanks, shipping cans, homogenizers, gages and heat exchangers.

Mr. Kingman pointed to the great importance of sanitation in the meat industry as a means of preventing spoilage. As an example, he observed that each pound of spoilage canceled the profit on 200 lb. of product. Strict sanitation, therefore, is an economic necessity all along the equipment line in the meat plant. And since many operations are carried out under refrigeration, sanitation takes on added difficulties, because it is not always feasible to use steam or hot water.

Frozen Foods

First on the program for the triple sessioned Wednesday morning, was a discussion on refrigeration and freezing, under the leadership of Clifford F. Evers, National Association Frozen Food Packers, Washington.

R. C. Poole, research and development engineer, Birds Eye - Snider division of General Foods, led off this panel by outlining the details in the operation of about a dozen processes now in use for the quick freezing of foods. Of these processes, all but one makes use of an external refrigerant. The exception is a flash freezing apparatus, which uses the latent heat of evaporation of water to reduce the temperature of the product being frozen to zero deg. F.

Hot packaging showed better results than cold from a bacterial standpoint, in the studies reported by Charles H. Harp, Food and Container Institute, QMC. Chicken a la king, produced and stored under varying temperatures, however, retained acceptability when stored at zero for as long as a year.

The frozen food industry must more fully avail itself of known sanitary technics if it is to attain highest quality, in the opinion of Walter L. Obold, professor of bacteriological sciences, Drexel Institute of Technology, Philadelphia. Every step in the processing and distribution of frozen foods must be characterized by good housekeeping and this includes the habits of the individual food handlers.

A more careful choice of raw materials for frozen foods was urged by Alvin I. Nelson, technical supervisor, frozen fruit and vegetable department, Loudon Manufacturing Co., Terre Haute, Ind. Using peas as an example, but indicating that the same principles applied to other vegetables, Dr. Nelson warned that low quality standards are no longer acceptable to the consumer. He emphasized the importance of careful contracting, soil conditions and proper spacing of planting and harvesting. Quality deteriorates when plants are jammed as the result of poor timing or over buying. He also urged all possible speed in handling peas from field to processing plant as well as pre-cooling and refrigeration when immediate processing is not possible.

Fish Technology

In the Wednesday morning session given over to fisheries technology, A. H. Warth, Crown Cork and Seal Co., Baltimore, held the chair. In opening this discussion, Cecil G. Dunn, department of food technology, M.I.T., reviewed chemical agents that would delay or avert fish spoilage. Selection of chemical agents for fish is difficult, he said, because many possible chemicals are toxic or objectionable in flavor or odor. Use of germicidal ices was mentioned as one possible method of delaying bacterial spoilage. Dipping fish in solutions containing preservatives was also effective, he said. Shucked clams, for example,

(*Continued on page* 192)

Odor Sources in Egg Storage And Methods of Removal

Control of relative humidity in egg storage is important. In high humidities, molds and bacteria on soiled packing materials produce foul odors. Ozonization fails, but activated carbon absorbs the odors

By C. R. GROSS, G. O. HALL and R. M. SMOCK
Department of Poultry Husbandry and Pomology
Cornell University, Ithaca, N. Y.

MANY of the causes of poor quality in stored eggs have been well summarized.[1] One specific cause is the absorption of foul odors during storage. Of the many possible sources of these odors, growth of molds or bacteria in the room is one of the most important. Another source might be the odors of other foodstuffs. For this reason eggs should not be stored with onions or cabbage.

Some types of flats and fillers contribute to the odors absorbed by eggs in storage.[2] This problem was recognized by the storage industry as being so serious that The Refrigeration Research Foundation requested and supported the work reported in this study. It was initiated to determine the influence of commonly used flats, fillers and wooden containers on the odor level in the storage chamber and in the eggs. The possibility of lowering odor levels by various means was also studied.

Odor Levels Judged

The odor levels in the eggs were judged after storage by a comparison of the odor of broken-out eggs with the odor of broken-out fresh eggs. The odor level in the storage chambers was judged, where possible, by the sense of smell and by the measurement of total volatiles. The technics of measuring certain odors by the measurement of "total volatiles" may be described briefly as follows: the volatiles from a measured volume of air are absorbed in sulphuric acid and are oxidized by ceric sulphate. The results are calculated in terms of milligrams of ceric sulphate reduced by the volatiles per cubic foot of air. Complete details of this method will be described by the senior author in a separate report.

Experiment I

To determine possible source of odor contamination, eggs were stored, at 40 deg. F., with various materials ordinarily used in packing, in gas tight metal chambers of 7.5 cu. ft. capacity each. Fifteen dozen eggs were stored in each such chamber. Carbon dioxide analyses of the atmosphere, after varying periods of storage, indicated that the accumulation never exceeded 1 percent in spite of the fact that the chambers were sealed.

Where container-wood, flats and fillers were used in these chambers enough were used to be the equivalent of 3½ egg crates. The wood in the sides, ends and bottoms of the crates was cottonwood but the tops were red gum. The flats and fillers were of spruce. In the control chamber eggs were stored in a metal pail without any container-wood or packing material. In a second chamber the eggs were stored with only the wood container. In a third chamber they were stored with the wood, flats and fillers. In the fourth chamber "used" container-wood, flats and fillers of unknown history were used. This material had been used at least once in marketing eggs. The wood was somewhat discolored and there were stains of various kinds on the flats and fillers.

In the fifth chamber the eggs were stored with container-wood, flats and fillers, but the eggs had been dipped in mineral oil before storage. In the sixth treatment the eggs were stored in a case in the large storage chamber in which the sealed chambers were held. All treatments were at 40 deg. F., but the relative humidity of the sealed chambers was an unknown factor. The relative humidity of the sixth treatment (unsealed) ranged from 80 to 85 percent.

It was realized at the start of the experiment that some water would be absorbed from the atmosphere by the container-wood since it was relatively dry. Hence, water was added to each chamber through a tube from time to time in an attempt to keep the relative humidity high. This was one of the most important factors in this experiment. For example, only about 100 c.c. of water were added to the control chamber—i.e., eggs only, yet this was enough to apparently saturate the atmosphere. Mold growth was prolific on the eggs at the end of the 90 day storage period.

Several additions of about 100 c.c. of water each were made to the chambers containing the container-wood and packing material during the storage period. There was little if any surface mold in any of these chambers. This meant that the container-wood and packing material had absorbed enough water to keep the relative humidity below saturation. The surface mold factor complicates interpretation of the results, yet it illustrates the extreme importance of relative humidity in the egg storage chamber.

After 90 days of storage, between 9.5 and 12 cu. ft. of storage room air was circulated through each chamber and the volatile level determined. The chambers were then opened and the eggs graded and sampled for odor level.

Results of Experiment I appear in Table I. The relative humidity in the "eggs alone" treatment was

obviously very high. The air cell in all the eggs was very small. Eggs were unmarketable because of the strong, moldy odor of the product. Molds were not only on the surface of the eggs but inside the shell. The level of oxidizable volatiles, as measured by the ceric sulphate method, was quite high. Because of this humidity factor it was not possible to use this chamber as a control or "check" chamber for odor comparisons insofar as the odors from the containers or flats and fillers were concerned.

Eggs with container-wood and container-wood with flats and fillers were obviously stored in a lower humidity condition. The air cell size was larger in these eggs than in the "eggs alone" treatment. The wood, flats and fillers must have absorbed considerable moisture even though water was added to the chambers. The volatile level in the air of these chambers and the odor level of the eggs was not very high, probably because of this humidity factor.

Eggs stored with used container-wood, flats and fillers had a "moderate" odor level! This odor level was high enough that the average housewife would probably have noticed it. Measurement of oxidizable volatiles did not indicate a particularly high level in this chamber. This means that the method is not as sensitive as the sense of smell, or that putrefactive odors may have been involved. The ceric sulphate method will not measure such gases.

The chamber with mineral oil treated eggs had less of a "storage odor" than those that were not oiled. The difference between oiled and non-oiled eggs was not striking in this regard but it was perceptible. The oxidizable volatile level was somewhat lower than in treatment 3, although the difference was not large. It is conceivable that the oil may have absorbed some of the odors in the chamber and prevented their entrance into the egg, but this is only a speculation. The egg cell size was small in these eggs and the grade was higher than in any of the other treatments in this experiment.

The eggs held in the large storage room (No. 6 treatment) had only a mild storage odor, since there were no other crates or other products in the room. The egg air cell size was smaller than in treatments 2, 3 and 4 because the humidity was probably higher in the air than it was in the sealed chambers with the wood and packing material.

Experiment II

This experiment was designed to test the efficiency of activated coconut shell carbon in removing the oxidizable volatiles in two undesirable odor situations in egg storage. The sources of the volatiles were from moldy eggs and from used egg container-wood, flats and fillers.

Two sealed chambers were set up in the following way: On the bottom of one chamber were placed 5 liters of water. Moldy eggs were then placed above this water in wire baskets. In the second chamber 5 liters of water were placed in the bottom and above this were placed used container-wood, flats and fillers. The chambers were then sealed and held at 40 deg. F. Relative humidity in these chambers was not measured, but presumably it would be very high.

After a storage period of only one week, the chambers were aspirated with outside air and the oxidizable volatiles were absorbed in sulphuric acid. After a second week's holding period the chambers were again aspirated, but this time the atmospheres were drawn through glass towers, each containing 40 grams of Columbia 4 ACW activated carbon. In every case 15 cu. ft. of air was aspirated through each storage chamber. The results appear in Table II.

It will be noted that the accumulation of oxidizable volatiles during one week was not great but was nevertheless measurable. It is evident that the volatiles from these two sources were removed by one pass through activated carbon.

Presentation of these data is not meant to imply that air purification with activated carbon would remove the odor problem from moldy eggs. The practical approach to this particular problem would be to prevent the growth of molds. It does suggest, however, that activated carbon can remove the oxidizable volatiles from moldy eggs and from used egg-case materials. It also suggests that air purification with activated carbon might logically be tested as a means of removing the foul odors evolved by used case-materials in egg storage chambers.

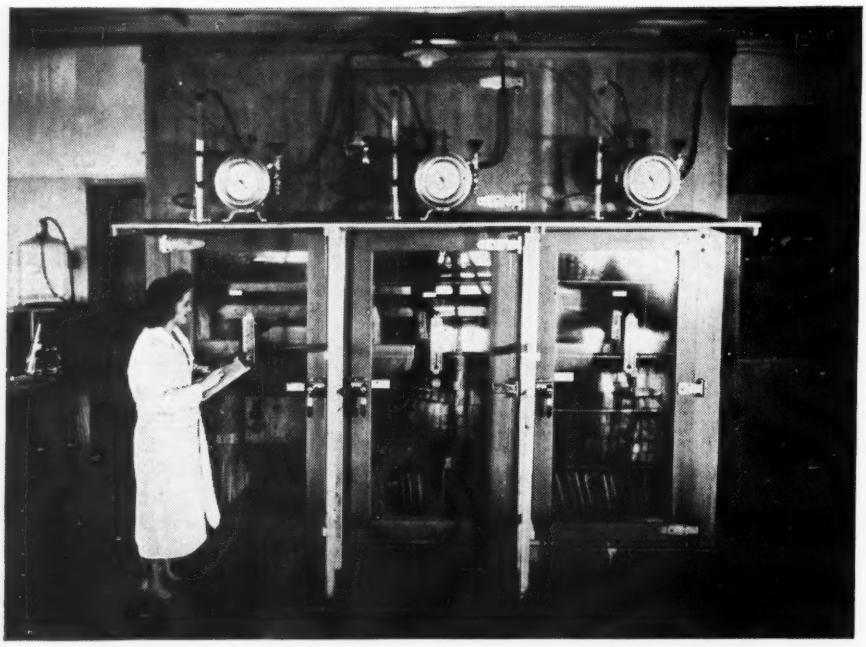


Fig. 1. Fifteen dozen eggs and the makings of 9 egg cases were placed in each refrigerated cabinet to be used in determining the effect of ozone and activated carbon upon oxidizable volatiles present in storage air. Apparatus used in sampling for oxidizable volatiles may be seen on the shelf. Temperature was maintained at 40 deg. F.

Experiment III

An attempt was made to reduce the oxidizable volatiles present in the storage air, and the odor level in eggs, by means of ozone and air purification with activated carbon. For this study three refrigerated cabinets measuring 8 ft. x 2.8 ft. x 2.4 ft. each were held at 40 deg. F. These cabinets and their arrangement may be seen in Fig. 1. In each cabinet was placed 15 dozen eggs (½ case), and around them were arranged the loose "makings" of 9 empty cases, including flats and fillers. These 9½ cases, if made up at 2.3 cu. ft. per case, would have occupied about 40 percent of the gross capacity of each cabinet. Materials were so arranged that there was a minimum of interference of air currents between them. Air was

TABLE I—Effect of Storage Treatment on Volatile Level in the Storage Air, Air Cell Size, Albumen Score, Grade and Odor of Eggs after 90 Days at 40 deg. F.

Storage treatment	Volatiles in storage air (ceric sulphate reduced) mg./cu. ft. air	Average air cell depth, inches	Albumen score (a)	U. S. grade (d)	Odor level in broken-out eggs
1. Eggs alone	3.37	2/16	...(b)	I	strong moldy
2. Eggs with container—wood	1.87	3/16	2.33	B	mild "storage" odor (c)
3. Eggs with container—wood, flats and fillers	2.05	3/16	2.08	B+	mild "storage" odor
4. Eggs with used container—wood, flats and fillers	2.05	3/16	2.67	B to B+	moderate "storage" odor
5. Oiled eggs with container—wood, flats and fillers	1.43	2/16	2.08	B+ to A	very mild "storage" odor
6. Eggs in crate in room air	...	2/16	2.50	B to B+	mild "storage" odor

(a) The lower the value, the better is egg quality, as indicated by score of condition of albumen of broken-out eggs. (Van Wagenen and Wilgus.)
(b) These eggs were unmarketable because of foul odor and red and black infection on the inside of shells.
(c) A "mild storage odor" describes the typically "flat" odor characteristic of many stored eggs. It is not an objectionable odor.
(d) There was some range in grades from egg to egg, so only the average grade is given. Most of the eggs were in the grade indicated.

TABLE II—Adsorption of Volatiles by Activated Carbon.

Source of volatiles	Ceric sulphate reduced—mg./cu. ft. air: After one week without carbon	Ceric sulphate reduced—mg./cu. ft. air: After 2 weeks aspirated through carbon
Moldy eggs	1.20	0.00
Used case material	.80	0.00
Laboratory air	.40	0.00

circulated by means of a propeller type fan blowing downward from the top of each cabinet.

An effort was made to maintain a high relative humidity by the use of hanging wet cloths. These cloths were kept saturated by a reservoir of water and the reservoir was replenished through a tube to the outside of the cabinet. Because of the low refrigerant temperature it was very difficult to maintain a high humidity. Some of the humidity effects will be noted under "results."

One cabinet was used as a control with no air purifying treatment. The second cabinet was equipped with one No. 42 Dorex canister of activated carbon. A blower circulated the air through this canister at the rate of 34 cfm. This blower was operated continuously. The third cabinet was equipped with a single tube Electroaire ozonizer regulated to supply about 5 ppm. of ozone. This machine was operated one hour per day unless otherwise noted.

Results

During the first 62 days of the storage the accumulation of oxidizable volatiles and the odor level in the cabinet air as detected by the sense of smell was very low. The highest determination of volatiles after 62 days was 1.5 mg. ceric sulphate reduced per cu. ft. of air, whereas volatiles in the laboratory air outside the cabinets were 1.2. This low accumulation was undoubtedly due to the low relative humidity prevailing in the cabinets. Relative humidity measurements indicated that the values seldom exceeded 45 percent.

After 62 days more drastic steps were taken to raise the relative humidity. The moist cheesecloth method was augmented by opening the cabinet doors momentarily and sprinkling the case material with a jet of water. This raised the relative humidity to a range of 61 to 75 percent. This technic meant that some accumulated volatiles would necessarily be lost each day as a result of opening doors.

Up until the 84th day of storage in the third cabinet, ozone had been used for 1 hour per day at a concentration of about 5 ppm. Analyses of oxidizable volatiles on the 75th day indicated that ozone was not reducing the volatile level below that of the control. Hence, to give ozone an even better chance, during the last week prior to the sampling date it was used for 3 hours per day at the same concentration. During the 24-hour sampling period it was used continuously.

After 92 days the oxidizable volatile level was again measured. The odor levels in the cabinets were judged by the sense of smell and the eggs were sampled in a manner similar to that in Experiment I. The results appear in Table III.

The odor level never became extremely high in any of these cabinets. This was undoubtedly due to the rather low relative humidity that prevailed at all times. Ozone did not seem to have any beneficial effect in lowering the oxidizable volatile levels or odor levels in the cabinet studied. Why the oxidizable volatiles were somewhat higher in the ozone cabinet than in the control is not clear. This was not a sampling error because two determinations were made in all cases. The odor level in broken-out eggs was about the same in the ozone cabinet as in the control.

The use of activated carbon reduced the oxidizable volatile level by one-half. The freshly broken-out eggs from this cabinet were almost odorless. They smelled more like fresh eggs than any lot of eggs sampled in any of these experiments.

Discussion

This report might be called the result of an exploratory study on odor problems in egg storage. It has revealed that there can be an odor problem from contaminating influences. It has also indicated that relative humidity in the storage is one of the main factors in determining odor levels. The growth of molds and bacteria in very high humidities is certainly one obvious source of foul odors. The effect of humidity on the evolution of volatiles from case materials has been illustrated both by this and previous studies. The relative humidity factor was also doubtless the predominant factor in determining air cell size and U. S. Grade as reported on in this study. In other words, grade and air cell size could be correlated with humidity differences from treatment to treatment and not directly to the main factors being studied in this investigation.

This study has illustrated that, in storage in a very high humidity, molds and bacteria could make the eggs unmarketable which has, of

(*Continued on page* 202)

TABLE III—Effect of Air Purification Methods on Storage Atmosphere and Egg Quality after 92 Days at 40 Deg. F.

Storage treatment	Volatiles in storage air (ceric sulphate reduced) mg./cu. ft.	Odor level in storage air	Average air cell depth, inches	Albumen score	Grade of eggs	Odor level in broken-out eggs
Control	1.19	Moderate	3/16	2.25	B to B+	Mild storage odor
Ozone	1.49	Moderate	4/16	2.76	B	Mild storage odor
Activated carbon	0.45	Very faint	3/16	2.92	B to B+	Very faint storage odor

Using a tractor-conveyor to unload cartons or sacks through a second story window.

The tractor-conveyor is a convenient and flexible method of moving materials. Here it is used in a warehouse in conjunction with a floor conveyor to re-pile cartons.

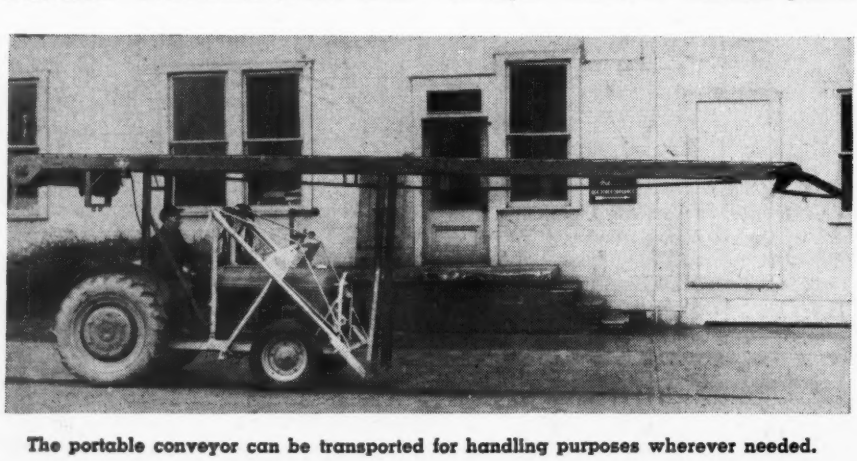
Materials Handling Made Easy With Tractor-Conveyor

Construction of a portable conveyor solved a complex materials handling problem for a company with warehouses scattered around the community. A belt conveyor was mounted on a tractor fitted with a hydraulic lift

BUILT in about a day and a half, a hybrid materials-handling device solved a not-uncommon problem for an Ohio concern with warehouses on different sites in the same town. Adequate facilities have been lacking for loading and unloading raw materials and finished products in plants where buildings are scattered. Inconvenience has often resulted because of the lack of a convenient and flexible method of moving cases, cartons, bags and boxes. There has been need for some way to eliminate the manhandling, overtime and demurrage costs. In some instances, furthermore, it has often been impracticable to move a continuous belt conveyor about to isolated plants and warehouses for materials handling purposes whenever the occasion arises.

This handling problem has now been solved by Clarence W. Rausch, O. M. Scott & Sons, Marysville, Ohio, with the construction of a tractor-conveyor. The tractor-conveyor is suited to a variety of applications in food plants with warehouses in various locations in a small community. It can be used: (1) To transport the conveyor for handling purposes wherever needed; (2) to unload from trucks, trailers and box cars into second story warehouses; (3) to load trucks and box cars from second story warehouses and (4) to restack cartons and sacks in warehouses in conjunction with a power belt conveyor.

The portable conveyor consists of a standard 24-ft. Rapids-Standard continuous conveyor belt mounted on a Fordson tractor, with the hydraulic lift of a Ferguson system



The portable conveyor can be transported for handling purposes wherever needed.

power scraper. The conveyor is manufactured by the Rapids-Standard Co., Inc., Grand Rapids, Mich. Like the Fordson tractors, the Ferguson lifts are made by the Ford Motor Co., Detroit, Mich. The conveyor is mounted so that the front end can be elevated 24 feet off the ground. This height is more than sufficient to load or unload material into second story warehouses.

Adjusting the Conveyor

Actually, the conveyor can be adjusted to any angle up to 60 degrees. A 60-degree angle, however, would be too upright to be practical. The conveyor is designed to be used from the rear of the tractor. It is seven feet off the ground when horizontal. It is transported from one building to another in this position. While horizontal, the conveyor overhangs the front end of the tractor about 17 feet, and extends 2½ to 3 feet to the rear.

At first, the front overhang created a problem. The weight of the conveyor made it difficult to steer the tractor. This problem was solved by removing the standard 6:00 x 16 tires from the front wheels and replacing them with oversize tires. These tires are inflated so as to support the weight of the conveyor, without making it difficult to drive it about from place to place.

Construction

Construction of the tractor-conveyor was simple. All that it required was to mount the conveyor to the hydraulic lift with four uprights and four diagonal brace rods which were welded to the equipment at the Marysville Foundry and Machine shop.

The conveyor is mounted so that it can be removed quickly and the scraper put back on it, if needed. It is only necessary to remove two bolts and pull out two short pins to remove the conveyor belt. Two additional short bolts are used to reattach the scraper blade to the lift in its original position. The scraper lift is standard equipment, manufactured for use with the tractor. It is attached to the tractor in the usual manner.

At first, Rausch was considering operating the conveyor from the tractor's power take-off. This idea was abandoned because the portable conveyor was used inside buildings. Carbon monoxide fumes from the tractor would make the operation dangerous.

Using a fork-lift truck to move two pallet loads of walnuts (50 bags) into a warehouse.

Warehousing Nuts on Pallets

Fork-lift trucks handle 1750 tons of walnuts daily. Two pallets, each with 25 100-lb. bags, are moved at a time

CONFRONTED with the problem of warehousing 1750 tons of nuts a day in the walnut season, California Walnut Growers' Assoc., Los Angeles, has worked out an efficient, integrated method involving warehouse design and materials handling. To handle this high seasonal load quickly and economically, a warehouse was built around the handling of palletized unit loads with storage battery-powered industrial trucks. The flexibility of fork-lift trucks and pallet operations provide a rapid and economical method of handling the high seasonal load.

Provision had to be made also for economical expansion and contraction of cold storage facilities, because of the seasonal character of the business. This was accomplished by constructing demountable, heat-insulated partitions. By removing the partitions, the size of the storage rooms can be quickly regulated to suit seasonal demands.

During rush season about 280,000 sq. ft. of floor space are required for temporary storage. Immediately following the rush season, only 110,000 sq. ft. are required. Only 43,000 sq. ft. of space are needed to provide permanent refrigeration.

A fleet of nine, 6000-lb. capacity, battery-powered, fork-lift trucks are used to: (1) Unload incoming freight cars, (2) transport to storage and (3) move palletized unit loads of walnuts from storage into outward shipment. Walnuts are graded before shipment to the warehouse. A palletized unit load of nuts consists of 25 sacks each, 100-lb., stacked in interlocking fashion. Each load is transported from cars to designated, easily identified, areas within the warehouse.

Incoming shipments are noted on a location sheet. When a demand for a certain grade of nuts is received, a fork-lift truck is dispatched to the correct area to pick up the load. This procedure has simplified inventory control.

In movement, two unit loads, of 50 sacks at a time, are moved by a fork-lift truck. Loads are stacked two-high in warehousing. In rush season, it is often necessary to tier three-high. Each truck moves about 4,000 sacks in an eight-hour shift. During the peak of the season, a two-shift day is operated, with nine trucks moving 56,000 sacks.

Compared to hand trucking, some of the advantages of the fork-lift truck-pallet system are:

1. A 75 percent saving in manpower. Handling a 2,500-lb. pallet-

(*Continued on page* 198)

Why A Packaging Laboratory?

Some perishables, including fish, meats, fruits and vegetables, present special packaging problems because they are moist. Processors profit by taking problems to the packaging laboratory and by working with suppliers

By JOHN V. ZIEMBA, Assistant Editor, "Food Industries"

WHEN a certain food company was forced to recall one of its products from the retail trade a few years ago, there was quite a story behind it.

The manufacturer found that he was getting a great many complaints about messy cartons and wax in the food. The trouble was finally traced to the fact that his product had been filled hot into heavily wet-waxed cartons and frozen. Hot-filling had melted the wax coating, and the cartons were no longer leak-proof. Wax had solidified into a layer on top of the food, and the product had penetrated through the cartons.

But that was not all. Previously, he had cooled the product before filling into a bag-in-box type carton. During the war his orders increased and help became scarce. To increase production, he omitted the cooling operation and his product was hot-filled. No complaints resulted when he used the bag-in-box type carton. But when paper became short and he thought he had the shortage licked by using a wet-waxed carton without a bag—then his troubles really began.

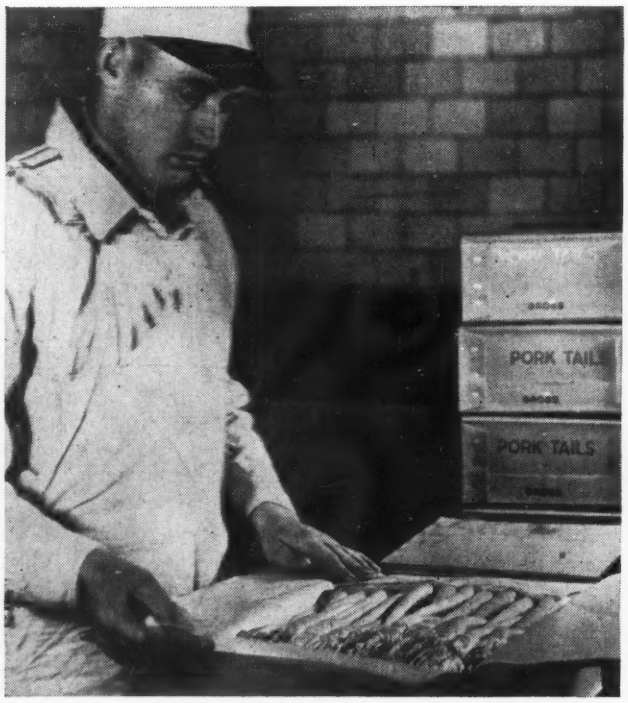
This is the first of several articles on the place and purpose of the packaging laboratory in a food processing organization. Additional articles will appear in subsequent issues which will discuss organization and function of such a laboratory.—The Editors.

Another company developed a bacon package which doubled shelf-life. But the printing ink had been a source of complaint. The printed, greaseproof wrappers were in direct contact with the bacon, and the ink odor was transmitted to the product. Difficulty in this case was due to the use of aniline inks. A change to vegetable inks would have eliminated complaints. On another occasion extra drier was added to the ink formula to facilitate drying. The objectionable odor could have been dissipated by airing the wrappers, or by the use of odorless inks now available.

The real reason for these costly experiences was that the companies had not made adequate tests of the packages. And, of course, this was because none of them had a packaging laboratory.

Cases like these could be recounted for several pages. A packaging laboratory is indispensable for any food company, whether small or large. It is merely a place, properly manned and fitted out, to study a firm's packaging problems before instead of after the damage is done by the use of improper packages.

In former years package testing was often sketchy—even haphazard—sometimes not done at all. Suppliers submitted their materials and



Packing pork tails in paper-lined, fiberboard containers for shipment to branch houses or to wholesale buyers.

Swift & Co. photos

Packers remove pans containing sausages from endless conveyor belt, pack them in 1-lb. cartons and overwrap each carton.

equipment in accordance with the processors' requests. Processors then conducted limited performance tests to evaluate packages, products and packaging equipment. When the production department took over, operating difficulties occurred on occasion. In some instances, packages did not hold up as well as expected.

In extreme cases, however, no tests were conducted. When the untested new packaging operations were started by the production department, operating difficulties were then even greater than when limited tests had been made. The issuance of inadequate specifications by the purchasing department to suppliers resulted in still other packaging difficulties.

Working With Suppliers

Whether the food processor has his own laboratory or not, there is one source of packaging information always open—his suppliers. Processors, in the past, usually have solicited the aid of suppliers of packaging materials and machines wherever they have had specific problems. Suppliers are a source of valuable assistance. They can be expected to continue such aid in the future and suggest money-saving changes. Improved packages and packaging technics will be developed with the cooperation of these outside companies.

Suppliers know their materials and equipment better than processors. They are constantly developing new packages and new machines. They are in regular contact with other branches of the food industry where new packaging developments are under way. Processors can profit from these new developments. Problems solved in another branch of the food industry may point the way to the solution of the processors' problems, or result in improved packages or better packaging technics.

It is not uncommon for the processors' technicians to work out their problems in the suppliers' laboratories. Nor is it uncommon for the suppliers' technicians to assist processors in their own laboratories.

Suppliers of metal and glass containers and flexible packaging materials usually employ qualified technicians. These technicians have devoted considerable time to the solution of food packaging problems. Some are specialists on dairy or meat or seafood products; others know fruits and vegetables. Similarly, manufacturers of packaging machines will often lend the services of their highly skilled specialty engineers to processors.

Swift & Co. photo

After slabs of bacon are sliced by a mechanical slicer, the sliced bacon travels along a conveyor to packers who weigh and wrap the sliced bacon in greaseproof wrappers.

How Suppliers Solve Problems

Sometimes agreements are made with suppliers to put up products in new packaging materials and test the packaged products for product protection, shelf-life and sales appeal. New packaging machines are also tested in this manner. In this way, the company has a ground-floor start on new packaging developments.

Most of the research for developing new packaging materials should be done by suppliers. This is especially true if food processors have a problem peculiar to their product, or if there is no other product like it on the market. The processors should guide the suppliers in their research by supplying information on the requirements of the food to be packaged. Processors should also assist suppliers with trial runs of their products as the suppliers progress in their work.

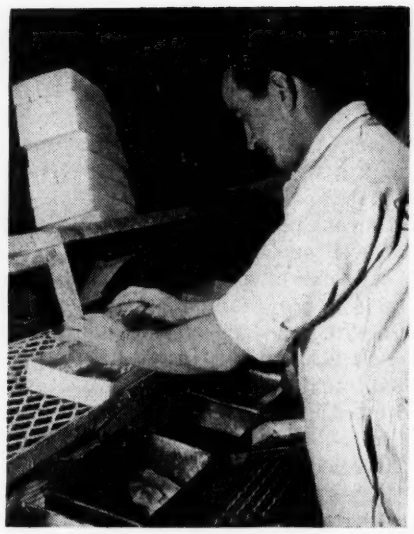
Taking Problems to Laboratory

Regardless of these excellent services from suppliers, the most progressive processors now take their problems first to their own laboratories, where qualified technicians have the facilities to evaluate packaged products and packaging equipment and to conduct unlimited performance tests.

These staff technicians know

Swift & Co. photo

New packaging methods solve marketing problems. Whole veal carcasses are "branded" or "stamped for grade" with printed transparent tape, then Saniseal wrapped.



General Foods Corp. photos

Packers wrap several Ocean Perch fillets at a time in suitable wrappers and pack them into fiberboard cartons. Cartons are then quick frozen. Selection of suitable wrappers is important. Wrappers must prevent freezer burn and not stick to frozen fillets.

what to expect from packages, and bag making, cartoning, weighing, filling, wrapping, carton closing, labeling, printing, sealing, case loading and bundling machines. What they do not know about packages and machines, they find out from the suppliers. They also know what happens to product quality due to improper packaging. They know their own products.

Packaging laboratories also guide the control laboratories in testing packaging materials submitted to plants by suppliers. With adequate paper testing equipment, the control laboratories determine the quality of packaging materials by conducting tests for moisture-vapor permeability, greaseproofness, tear strength and wet strength.

Often specifications issued by purchasing departments are inadequate. A well organized packaging laboratory, however, is able to draw up proper specifications for the purchasing department. With adequate specifications, suppliers are then in a position to furnish materials and machines, guaranteed to live up to these specifications.

Following New Developments

Processors are constantly kept informed on packaging developments through their packaging laboratory, which serves as a clearing house for the company on packaging information.

Knowledge of new materials and machines is obtained from trade papers, advertisements, information on competitors' products, patents, and attendance at meetings and packaging expositions. Additional information is collected by contacting suppliers' sales and technical departments and visiting suppliers' plants and laboratories.

Types of Problems to Refer To a Packaging Laboratory

Within the processors' plants, the packaging laboratory functions to overcome many of their knottiest problems. Better product protection will follow the development of better packaging methods and use of better packages. Proper packaging will reduce shrinkage of fresh or frozen perishables and extend shelf-life by minimizing discoloration, rancidity, growth of spoilage organisms and dehydration. In addition to these advantages the important advantage of economy is often gained also.

Packaging of Perishables

Of the entire food industry, none is more package-conscious at present than the perishable commodity branch. Some packaging laboratories, accordingly, are testing new packages for fresh and frozen perishables, and making thorough shipping and distributing tests of packages to be adopted. With the advent of modern, self-service merchandising methods, many processors are eyeing the sales expansion of prepackaged fresh and frozen meats, fish, sea foods, fruits and vegetables.

A packaging pilot plant has already been formed by several fruit and vegetable producer cooperatives in the West to study methods of preparing, packaging, shipping and distributing these perishables. Undoubtedly, there are and will be more of these packaging pilot plants.

Institutional Packages

Packaging laboratories are also working out new types of institutional packages. These are improvements over the older packages. The institutional trade is seeking new packaged products, which will simplify the preparation of meals.

Instead of buying hotel cuts, hotels and restaurants want their meats already prepared for broiling, frying, roasting and stewing. The meats must be uniformly shaped and sliced and then packaged. The new packages will do away with hotel and large restaurant butchers, who are required to cut up hotel cuts into roasts, steaks, chops and trimmings.

A notable trend in the institutional package is the trend toward producing frozen steaks, rib or loin chops, beef or veal liver slices and hamburger patties of uniform weight and thickness. Advantages of these packaged cuts are many. Packaging can be simplified and standardized. Better protection can be given to products. Packages with sales appeal can be presented to the sales departments. Hotels and restaurants can provide customers with prompter service.

The aforementioned meat items require equipment available in packing houses or modifications of equipment that can readily be converted by company machine shops.

All but bone-in meats are capable of being molded into any shape desired. Upon freezing, the molded meat will retain the shape of its mold. Removal of the frozen, molded meat will vary in simplicity and, of course, will depend upon the type of mold used. Slices of uniform weights and thicknesses can then be obtained either by manual or mechanical means, depending upon the use of electrically operated band saws or mechanical slicers. Packaging developments in this field are unlimited and subsequent developments are inter-

changeable and may be used with modifications, in the development of retail style packages.

Choosing Cartons

Carton problems are always before the packaging laboratory. Knowing the formulation of the product, the laboratory will limit the selection of cartons and determine the shelf-life of the product in proposed cartons. Certain products dry out. Consequently, moistureproof cartons must be selected. Other products become moist and soggy in moistureproof cartons. The laboratory is on the lookout for printing inks, adhesives, paraffines and other coatings likely to contaminate food odor, flavor or color.

Use of Wrapper

Wrappers may be a constant source of trouble when not properly applied. They may not be tight enough, so that some foods are likely to become insect-infested. Lightweight wrappers cause breakage. Low melting point waxes or other thermoplastic waxes must be tested for heat sealability, otherwise cartons must be recalled from the retail trade for rewrapping.

Some wrappers stick to frozen fish and meats. Others delaminate. Aluminum foil wrappers must be suitably lacquered when in contact with salty foods, or the foil will corrode.

Closures and Containers

Packaging laboratories must test the effectiveness of closures, cap specifications and contamination of product with odoriferous material in the liners. Package testing also includes barrels and drums, shipping containers, glass and metal containers, liners, labels, bags and adhesives.

Unusual Packaging Problems

At times the packaging laboratory may be called upon to handle unusual problems. For example, it may be asked to devise a method of making out-of-season raw materials available for the production department at all times, as was one packaging laboratory in the case of the manufacture of a perishable product. This department operated seasonally, because the main ingredient was available during certain seasons when it had to be used. Consequently, the product glutted the market, and prices took a drop.

The laboratory was able to solve this problem through adequate packaging. The raw material was packaged in bulk when the market was glutted, frozen and stored. This department is now operating continuously by removing its daily requirements from cold storage. The fresh product is now available all year round.

Some Auxiliary Problems

In conjunction with the undertaking of many of the frozen food packaging problems, auxiliary problems exist, including:

1. Evaluation of various methods of freezing packaged fish, meats, fruits and vegetables.
2. Proper design of freezer units, looking forward to automatic handling of packaged products.
3. Temperatures involved in the processing and handling of precooked, frozen foods prior to and subsequent to freezing.
4. Development of non-returnable shipping containers for fresh and frozen products.
5. Survey of temperatures in warehouse coolers and freezers.
6. Survey of temperatures in refrigerator cars on mixed and straight carload shipments of prepackaged fresh and frozen products.
7. Evaluation of protective coverings required for the frozen section in a mixed carload lot shipment.

Where Problems Originate

Problems may originate with sales, operating, quality control and purchasing departments. The production department, in seeking to correct or improve packaging operations, obtains the services of the packaging laboratory. Problems may result from waste, breakage or inefficient operations. The laboratory seeks the source of the trouble and makes recommendations for proper corrective measures.

Working With Sales

Problems originating from the sales department may be from two sources: (1) Consumer complaints and (2) competitors' products. Salesmen may report that products are not reaching the customers in a satisfactory condition. Damage claims result from improper and inadequate packaging.

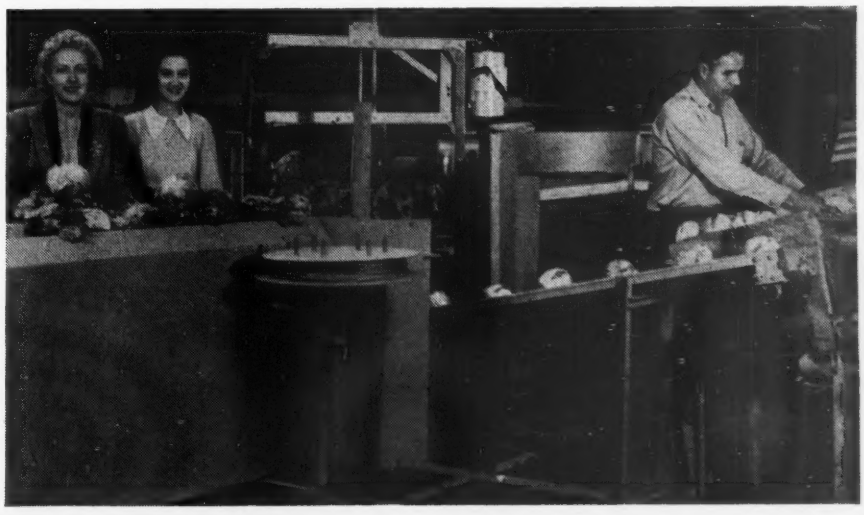
Progressive processors have their salesmen collect their products on the market so that they can be tested to determine if the quality is maintained or out of line. If out of line, why, and how can the condition be corrected?

The sales department also obtains samples for the production department to determine if the competitors' products can be duplicated. Samples are submitted to the packaging laboratory where the package is analyzed. A report is issued describing the package. If the product is to be duplicated, the packaging laboratory recommends adequate packaging materials.

Surveys may frequently be made on competitive products to determine if they run into the same

(*Continued on page* 204)

Fresh celery is first trimmed and cleaned and then packaged into transparent bags.



Packaging prolongs the shelf-life of fresh produce, assures customers of better quality and reduces waste. Here the Dodge packaging machine is used to wrap lettuce heads.

Ultraviolet Lamps To Control Fungi

How much UV radiation is needed to kill molds and their spores? Filaments are easy but colored spores are more difficult. The darker they are, the more UV they require

By RUDOLPH NAGY
Lamp Division Research Laboratory
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Ultraviolet radiations are used to sterilize washed milk cans before filling.

THE effect of sunlight on fungi was studied by Fries[1] as early as 1821. Ehrismann and Noethling[2] and Oter,[3] over 100 years later, determined that radiations at 2650 Angstrom units were the most lethal to fungi. Much of the work reported cannot be duplicated because no accurate measurements of ultraviolet radiation are given. The technic of exposing the mold has also been questionable.

Development of the Sterilamp* which produces most of its radiation near the peak of the fungicidal curve, and the integrating meter for the measurement of this radiation, have made it possible to study their effect on some of the more common molds.

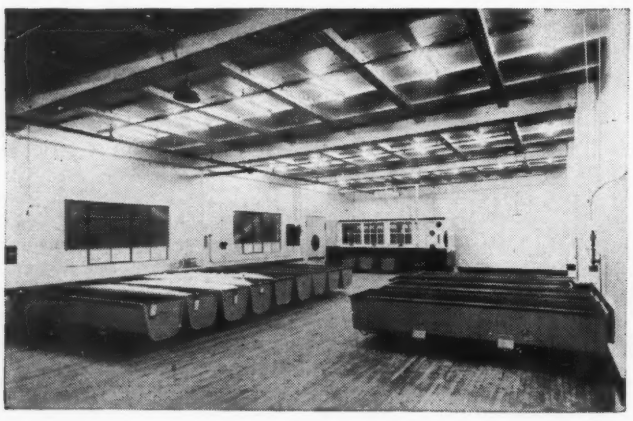
*Trade name for a bactericidal ultraviolet lamp made by Westinghouse Electric Corporation.

Pure strains of mold obtained from the American Type Collection were grown on Sabouraud's agar until copious spores were developed. These spores were then suspended in sterile broth and sprayed into a large fiberboard box. After the spray had been allowed to settle for two minutes, sterile Petri plates with Sabouraud's agar were introduced into the bottom of the box. In this manner a uniform seeding of spores was obtained.

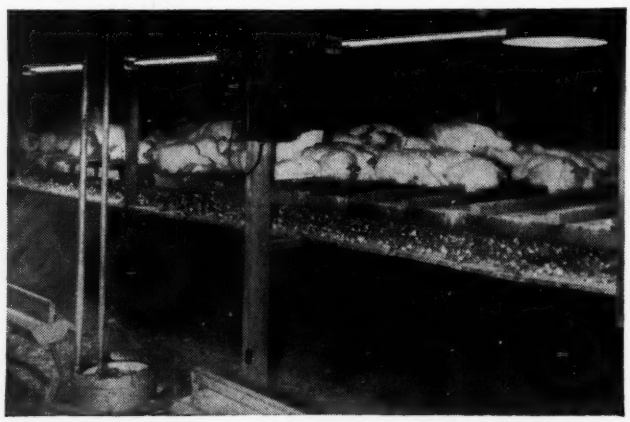
With the aid of an intergrating ultraviolet meter, the plates were exposed to measured amounts of ultraviolet radiation and allowed to incubate for 48 hours. The ratio of colonies on the exposed plates to those on the unexposed plates gave the efficacy of the radiation in destroying mold spores, Table I.

Mold spores tested under these conditions were destroyed when exposed to sufficient amounts of radiation. Pigment apparently acts as a protective mechanism. That is, the darker the pigment the more radiation is required to destroy the mold spores. The amount of energy required to destroy *Oospora lactis*, which is devoid of pigment, is of the same order of magnitude as that for bacteria.

Bactericidal ultraviolet lamps have made possible the economical ultilization of fungicidal radiation in industry. Some of the first installations were used to control the growth of mold in meat coolers. The holding period was greatly extended because both mold and bacteria on the meat were killed.



Bactericidal lamps in the dough room of a bakery destroy molds.



Germicidal lamps help produce larger and healthier pullets.

The irradiation of air in bakeries has reduced the spoilage of bread due to mold. Many manufacturers of cosmetics, pharmaceutical houses, breweries and others have used ultraviolet radiations to destroy mold and improve their products. Farms and dairies have also profited by these invisible lethal rays. Reduction in infections, some of which may be due to fungi, have enabled chicken raisers to produce a larger and healthier pullet in less time than was heretofore thought possible.

Continuous Exposures

When desiring to destroy molds by bactericidal lamps it is impractical to utilize the amount of ultraviolet radiation reported in Table I. Both laboratory tests and field observations, have shown that the control of mold and bacteria can be accomplished with a fraction of this quantity of ultraviolet energy. This is due to the fact that at certain stages in the life cycle of organisms, they are very sensitive to ultraviolet radiations. Thus sublethal doses given over a long period of time, so as to cover one or more life cycles of the organisms, will accomplish more than higher intensities of radiation over short periods.

Knowledge of the properties of ultraviolet radiations will immediately reveal to what extent Sterilamps as fungicidal agents can be applied. The absorption of short rays by most materials, especially those containing proteins, is very pronounced. Therefore, ultraviolet radiations can only be used for the destruction of organisms on the immediate surface.

Any organisms which may be in the food product or covered by a thick layer of bacteria or mycelium will be protected and not destroyed. Thus bactericidal lamps may be used in bakery dough rooms to destroy molds without affecting the growth of yeast in the dough.

Studies on the effect of ultraviolet radiations on various fungi have considerably enhanced our knowledge of these organisms and have aided in the development of methods of controlling them.

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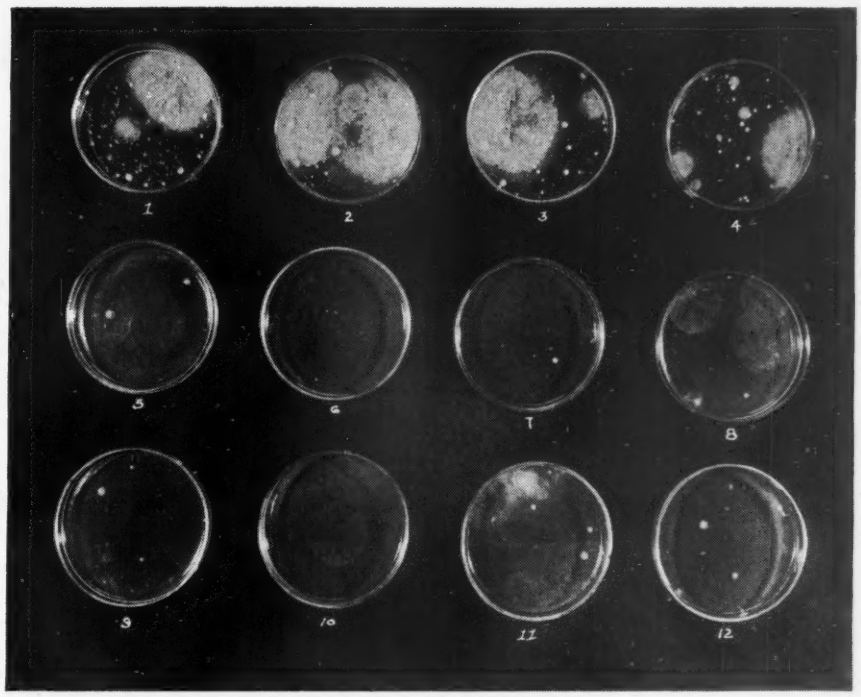


Sterile Petri plates exposed in a modern dairy barn during the milking period. Plates 1 to 4 were obtained before the installation of ultraviolet lamps. Plates 5 to 12 were obtained under identical conditions but after their installation. Note the large numbers of bacterial colonies and heavy mold growth in the top row of samples.

An installation of bactericidal lamps used to destroy air-borne organisms in a penicillin dehydration room. Photographs courtesy of Westinghouse Electric Corporation.

TABLE I—Energies Required to Destroy Mold Spores by Ultraviolet Radiations.

Mold spores	Color	General habitat	"Clicks" of energy*
Penicillium roquefortii	green	cheese	120
Penicillium expansum	olive	apples, fruits	100
Penici.lium digitatum	olive	citrus fruits	400
Aspergillus niger	black	all food	1500
Aspergillus flavus	yellowish green	grains, soil	450
Aspergillus glaucus	bluish green	soil, grain, hay	400
Rhizoi us nigricans	black	fruits, vegetables	1000
Mucor racemosus A	white gray	meats	160
Mucor racemosus B	white gray	meats	160
Oospora lactis	white	cream, butter	50

*One "Click" is equivalent to 220 micro-watts sec/cm².

Precooked Frozen Foods On A Production Line Basis*

Problem of scheduling is large. Many of the production items must arrive simultaneously at the assembly point on time. Special formulas are needed. Pilot runs must be undertaken before new products are released for sale

By L. SPITZ, Vice-President in Charge of Production, and
T. DERBY, Manager of Quality Control
Maxson Food Systems, Inc., Queens Village, N. Y.

THE manufacture of precooked frozen plate dinners originated with the Navy's desire during World War II to improve eating conditions aboard their transport planes. As with commercial airlines, food served was usually the box lunch, with thermos coffee. A hot meal was just a dream until W. L. Maxson worked out the problem.

At first he was successful in freezing cooked dinners on plates. Later he designed an oven which could heat the food from the frozen state to about 165 deg. F. in minimum time. The result was the Maxson Whirlwind Oven, a compact, electrically heated oven, with a built-in fan, capable of heating six meals in 15 minutes.

The results were presented to the Navy, and immediately orders were placed. W. L. Maxson Corp. proceeded to manufacture the ovens and, since no one was available to produce the food, also undertook the processing. From this obscure beginning, stems the now active field of cooked frozen dinners. A plant was built and many processing and control problems were investigated and overcome.

Acceptance of Product

Such airlines as Pan American, Northwest, Royal Dutch and Swedish Airlines have accepted the frozen plate dinners and the Maxson Whirlwind Oven. An ambitious program has been set up to convince other food service people that frozen plate dinners and the ovens should be adopted. The railroads are interested, and investigations are being made with them to develop reheating and service technics. One of the quickest to accept the food and system was the small boat owner.

The Maxson plate meal was introduced on the market in one locality under the name "Strato-Plate" to determine consumer acceptance. Up until this time nothing was available as to consumer acceptance—quality, flavor, size of portion, or the plate idea. General high acceptance permitted continued production, with the eventual launching of the Maxson Meal-on-a-Plate.

Some of the Developments

An odorless, tasteless and non-toxic plastic-coated molded paper plate was developed. Frozen molded portions are assembled on the plate which is then packaged and held at low temperatures until marketed. The consumer can heat and serve the meal on this plate. A total of 19 varieties of plate dinners were successfully marketed. Meals cover the entire range from tenderloin steak and roast turkey to macaroni au gratin, each with accompanying vegetables, such as green peas, spinach pimento, and glazed apples. The Maxson Food Systems pioneered French fried potatoes. An unusual item, the potato puff, has had high acceptance.

Assembly Difficulties

At first, the cooking and assembling operations in the manufacture of frozen cooked foods were not properly synchronized. Production-wise, this created serious problems when products were assembled on plates and frozen.

Most important was the timing required. Meats, vegetables, and sauces had to be ready at approximately the same time. Consequently, an abnormal stress was placed on the preparation and cooking departments. In attempting to anticipate assembly needs, foods were sometimes prepared too soon for the assembly department to handle. This resulted in holding cooked foods too long, with the ever-present danger of product spoilage and condemnation. In addition to timing, the quantity of food had to be properly proportioned to prevent wasteful leftovers at the end of the working day.

Cooking and assembly operations were simplified by devising a method for molding individual portions of food. Specially-designed mold trays were developed for meat and vegetable components. The molding operation has been an interesting development. At the outset, it seemed impossible. The assembly girls could not master a quick technic in working with the mold trays, and freezing took four to five hours. Eventually, through instructions and teamwork the assembly operation was increased to 7,000 vegetable and 3,000 meat units per hour. By making minor changes in the design of the freezing tunnel, freezing time was reduced to 45 minutes. With the time interval between cooking and freezing minimized, one of the great pitfalls in the preparation of precooked frozen foods had in some measure been overcome.

*Based on papers on program of Annual Frozen Food Conference sponsored by New Jersey Agricultural Experiment Station, New Brunswick, N. J.

Advantages result from the use of sauces in cooked frozen foods. In the first place, they provide products with an ideal protective coating. Dehydration and oxidation are minimized. Secondly, they facilitate molding and the removal of frozen products from the molds. Thirdly, they enhance flavor characteristics, since each sauce is prepared for a specific product. Sauces, however, are extremely difficult to freeze, since they may separate or gel. Separation or gelling was overcome after the sauce ingredients and methods of preparation were carefully investigated.

Of the meats available, a number were found satisfactory. Others, however, were not acceptable. Excellent results have been obtained in freezing beef, lamb, veal and poultry. Cooking and freezing of pork and pork products is not recommended at this time because of the tendency of these products to become rancid within a short time.

Planning Production

Scheduling and planning are important in the operating program. A balance must be established between the various departments. Meat fabrication must precede cooking, and cooking must precede the assembling operation.

In a complex item, such as roast turkey, dressing, and gravy, the birds must first be roasted. After the cooking department roasts the turkeys, meat must be separated from carcasses and sliced. Meanwhile, the dressing must be prepared and sliced, and the gravy made. Nevertheless the plant has overcome scheduling problems and has processed as many as 15,000 portions of turkey in an eight-hour day. The operation requires departmentalization and supervision.

Mechanized Equipment Necessary

Cooking processes require different methods of applying heat, such as boiling, grilling, broiling, roasting, potting, braising, or deep fat frying. Where volume indicates the necessity of specialized or highly mechanized equipment for cooking, new equipment must be designed and developed.

For example, need for a mechanical fryer was indicated for the production of French fried potatoes. Originally, French fries were hand-fried in baskets. The maximum quantity that could be processed in a work week was 17,000 ten-ounce packages.

An efficient, high-speed, high-volume fryer, called the Maxson Fryer, was developed. A battery of four of these units processes 4,000 ten-ounce packages per hour. In a single eight-hour day, almost twice as many French fries were produced as the hand operation was capable of producing in one week.

Uniform, individual slices of choice beef are cut and weighed by hotel type butchers. A band saw is used to slice individual portions of frozen, sliced turkey dressing.

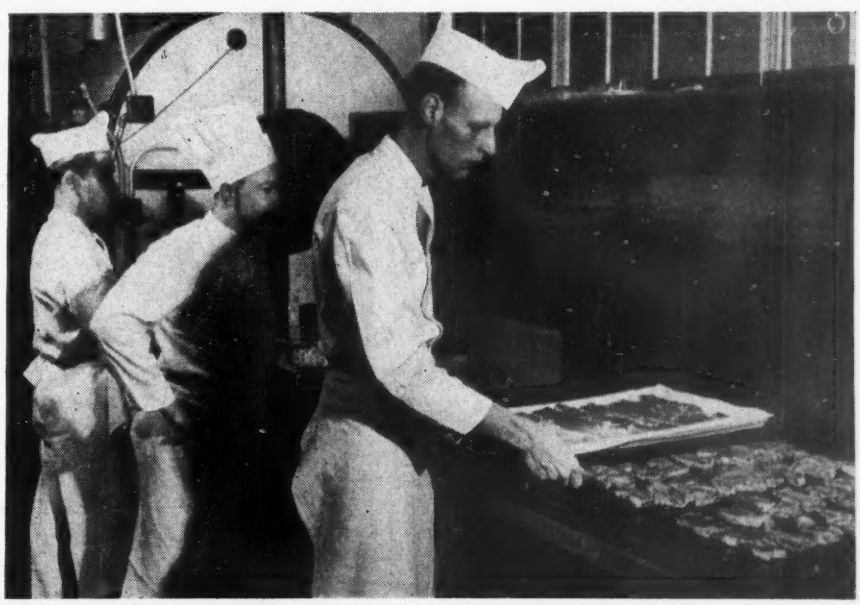
Straight Line Production

Product flow must be stressed. The butcher department must be designed so that one section receives meat directly from the receiving ramp. Here the meat is fabricated and taken to the adjoining kitchen. The kitchen must have cooking facilities which consist of a battery of kettles, ovens, steam cookers, grills, and deep fat fryers. In addition there must be a variety of specialized equipment, such as meat and vegetable dicers, slicers, comminuting machines, homogenizers, mixers, and blenders.

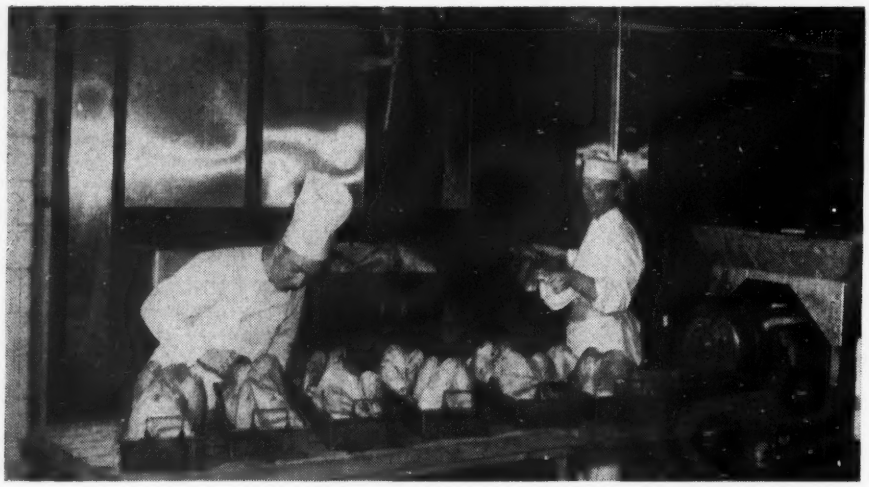
The assembly area adjoins the kitchen or cooking area, and line assembly is the technic. Mold trays are filled and placed on rack trucks which pass automatically through a blast freezer tunnel (–20 deg. F.) by means of a conveyor. The demolding station is located at the discharge end of the tunnel. At the demolding station components are removed from mold trays and assembled on plates or individual component packages and conveyed to an adjoining cold storage room.

Formula Development

No item is processed until a formula, designated as a foundation formula, has been developed. Formulas are prepared by eminent chefs at the Maxson plant, and the products made from these formulas are taste-tested by a products approval board. If the board approves both the product and production cost, further development is under-



Grilling tenderloin steaks and deep frying French fried potatoes for a Maxson meal, comprising tenderloin steak with sauce Bercy, peas with butter sauce and French fries.



Broad-breast young Tom turkeys are roasted to the exact degree of doneness in a rotary oven with close temperature control. Oven roasts about 1,000 lb. of birds an hour.

taken and a pilot run is made. The pilot run is a "blow-up" of the foundation formula, with the batch large enough to be handled by plant equipment.

Considerable information is collected from a pilot run. Formula corrections and production changes may be required, and necessary adjustments made. The batch formula, consisting of a fixed number of portions, is developed. Temperatures and times necessary for cooking are set up. Processing procedures and specifications for the type and quality of raw materials are established.

Results of the pilot run are resubmitted to the products approval board. If the product is found satisfactory, a new product is added to the company's line, awaiting production release from the sales department.

When actual production starts, the buyer, receiving clerk and processing superintendent are properly instructed on materials to be used to process the new product. The quality control manager prepares to insure that another correctly manufactured product of uniform size, weight and quality will result from each batch.

Precautions taken to insure quality merchandise start with the inspection of all raw materials. These must be carefully sampled upon receipt and examined to determine if they meet rigid purchasing specifications for size, grade, and other special requirements. Materials which do not meet these specifications are rejected.

Preparation, such as peeling and trimming fruits and vegetables and the fabrication of meats, must also be closely inspected. Ingredient weights for unit batches and times and temperatures for each cooking operation must be spot-checked. Molding of cooked foods prior to freezing must be under constant surveillance of an inspector.

Samples of frozen product must be collected from the assembly line and tested. Finished packages must be check-weighed. The test kitchen must heat samples which are examined by the taste panel for flavor, texture, appearance, and overall palatability. The laboratory must analyze samples for total bacteria count and prove the absence of coliforms and staphylococci. Under no circumstance is a product packaged or released for sale, unless it meets rigid organoleptic and bacteriological standards.

Each precooked frozen food item requires special controls, peculiar to the item. Quality control applied to Maxson foods can be illustrated in the manufacture of French fried potatoes. Here is what quality control entails for this product.

Potatoes are purchased. All the farmer's skill and technic in planting, growing, protecting from disease, harvesting, and storing are critically examined. The potatoes must meet size and variety specifications, with minimum defects.

Next, their sugar content must be determined. Potatoes must have

(*Continued on page* 206)

Skilled operators in assembly department weigh individual portions of sliced turkey for the sliced, roast turkey-dressing-gravy meal.

Continuous assembling of cooked foods. Foods are weighed and placed in mold trays which are loaded on racks and then frozen.

Own Your Own Trademark

The Lanham Act offers a greater measure of protection than has hitherto been provided. Here are some of the provisions that will be of immediate concern to food manufacturers, whose identifying marks have gained hard won recognition

By PAUL D. BOONE, Patent Attorney, Washington, D. C.

THE Lanham Act, embodying old and new trademark regulations, goes into effect July 5. This Act, while protecting registrations under the Acts of 1880, 1905 and 1920, incorporates many new features which both strengthen and expand trademark protection. It represents the biggest stride in bringing the trademark laws up to date by recognizing the changes that have taken place in business and commercial practice in recent years.

The Act provides two categories for registration of trademarks, namely those on the Principal Register and those on the Supplemental Register. It is on the former that attention will be primarily focused here.

One of the outstanding advantages of registration under the new trademark law is that registration of a mark on the principal register serves as *constructive* notice of the registrant's claim of ownership. This means that the registration itself in the Patent Office, is sufficient to assure that *after* issue date there can be no other lawful user in interstate commerce. There is one exception. Where prior adoption and use can be proved, the same or a similar mark can be registered by the Commissioner of Patents, "as concurrent registrations" to more than one entity. In these cases, however, the Patent Office must be satisfied that confusion or deceit of purchasers is not likely to result and may prescribe the use of the goods so that confusion will not result. This concurrent use, it will be noted, is only open to a person who has adopted and used the mark *prior* to the filing date of the registration, and without knowledge of the other's use—never to a subsequent user. It matters not that a subsequent user adopted and used a mark, which is registered, in good faith. The subsequent user is charged with notice under the new trademark law.

One authority has stated that because of the provision which the Lanham Act affords, as to constructive notice of the registrant's claim of ownership, its effect is substantially the same as that obtained by the recording of deeds in the case of real property.

However, in order to collect profits and damages under the provisions of this new trademark act, in an infringement suit, it is incumbent upon the registrant to display with his mark the words, "Registered in U. S. Patent Office," or "Reg. U. S. Pat. Off.," or the symbol ® The last was not recognized under the old laws.

Incontestability

The next most important provision of the new law is that *after* five consecutive years from the date of such registration, the registered mark shall become incontestable. To secure this incontestability, the registrant must file an affidavit with the Commissioner of Patents, within one year after the expiration of this five-year period, setting forth the goods or services on which the mark has been in continuous use for five consecutive years. The affidavit must also assert that the mark is still in use in commerce. This same incontestable right is also accorded owners of marks registered under the Acts of 1881 and 1905. To secure it the owner simply has his registered mark republished on the Principal Register, and after this five year period files the affidavit.

There are several exceptions to this incontestability provision, however, and upon which cancellation proceedings will be entertained by the Patent Office. Any person who believes that he is, or will be, damaged by the registration of a mark, may apply to cancel it. The Federal Trade Commission may do likewise. This must be within five years from the date of registration, but there is no time limit for filing a petition to cancel a trademark's registration if:

(1) the mark has become the common descriptive name of an article on which a *patent* has expired.

(2) the mark has been abandoned,

(3) registration of the mark was secured by fraud,

(4) subject matter of registration should not have been registered initially,

(5) collective or certification mark falsely represents that the owner or a user makes or sells the goods, or performs the services on or in connection with which the mark was used,

(6) the mark has been assigned and is being used by, or with the permission of the assignee to misrepresent the source of the goods or service.

Proof of any one of these circumstances will take away from the registrant, by cancellation, all rights to exclude others from using the mark.

Where there is a concurrent registration, that second person, who must have established a prior adoption and use, retains his rights within the limitations affixed to his registration in the face of the acquisition of incontestable rights by the other user.

Where the registered mark has thus become incontestable, the certificate issued the person is conclusive evidence of the exclusive right to use the mark in commerce on the goods or in connection with services for which obtained. In a suit against a defendant on an incontestable registered mark, this can be overcome, however, by any one of the seven following defenses:

(1) the registration, or incontestable right to use, was secured by fraud,

(2) the registered mark has become abandoned by registrant,

(3) the mark has been assigned, and is being used by or with the permission of the assignee so as to misrepresent the source of the goods or services,

(4) the alleged infringing mark is a use other than a trade- or service mark of the defendant's individual name in his own business, or is a use of a descriptive term or device used fairly and in good faith to describe to users the goods or their geographic origin,

(5) the alleged infringing mark is a valid concurrent use, i.e. continuously used prior to date of published mark. This defense is limited to the area in which such continuous use is proven.

(6) the alleged infringing mark was registered under the Act of 1881 or 1905 and used prior to publication of the registered mark, and is still in use,

(7) the alleged infringing mark has been, or is being, used in violation of the anti-trust laws.

Loss of trademark would very often be a heavy penalty for minor and frequently unintentional violation of an anti-trust regulation.

While undoubtedly the features of constructive notice and approximate incontestability after six years are the most important in the Lanham Act, there are several others of no little merit. These can be summarized.

Other Features

A provision quite contrary to the present practice of federal trademark registration is that of registering the same or a similar mark to more than one registrant. Under the New Act this can be done "as concurrent registrations" where there is lawful use; this is generally interpreted to mean prior in some part of the country to the filing date of any registered mark in question.

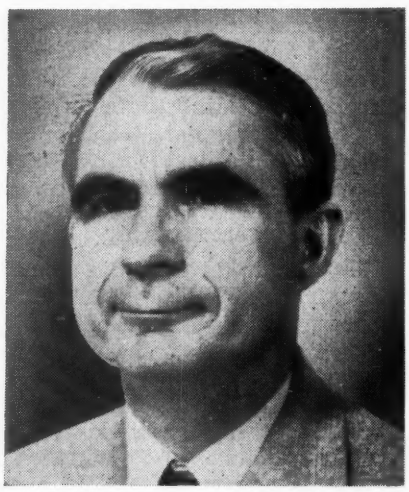
In the case of concurrent registrations, the certificate is conclusive evidence of the registrant's exclusive right to use the mark subject to the conditions and limitations specified. There are three of these, namely, the place, such as state where the mark may be used, the specific goods upon which it may be used, and the mode or manner in which it is used.

The duration of each certificate of registration is for twenty years, but the registration will be automatically canceled by the Commissioner of Patents at the end of six years unless the affidavit of continuing use is filed in the Patent Office in the period between its fifth and sixth years. There may be an excuse for non-use to offset the presumption of abandonment which can be offered. Each certificate of registration, when issued by the Patent Office, will have attached to it the notice of this requirement.

The marks registered under the new law can be renewed at the end of twenty years. Here again the Patent Office makes the registrant prove his right to further use of the mark, with the attendant advantages of its federal registration, by filing an affidavit of continuing use. The periodic checkup on registrations after issuance and renewal, will accordingly function to keep upon the Principal Register only "live" marks. Then by searching the U. S. registered marks it will be possible to determine whether a mark is available for registration in interstate commerce, assuming there is no intent of deception and intervening prior rights have not arisen.

Abandonment

A trademark may also be lost by abandonment. Discontinuance of the use of a registered mark with the intent not to resume, constitutes another form of abandonment.



PAUL D. BOONE

Nonuse for two consecutive years is considered prima facie abandonment. A mark is also deemed to be abandoned, "when any course of conduct of the registrant, including acts of omission or commission, cause the mark to lose its significance as an indication or origin." If a registrant acquiesces in the use of the mark by another person, or allows an unreasonable time to lapse before taking action against an infringer, he will be estopped from enjoining another person who has used the mark. If he has permitted the mark to attain a generic use as applied to an article or substance, he cannot enjoin anyone. In the last, the mark has become a common noun, or simply description.

Service marks, certification marks, and collective marks which are defined in the next three paragraphs are registerable upon separate registers under the Lanham Act in the same manner, and with the same effect, as trademarks. This includes the same equal protection.

A service mark is "a mark used in the sales of advertising of services to identify the *services* of one person." It includes "the marks, names, symbols, titles, designations, slogans, character names, and distinctive features of radio, or other advertising used in commerce." This is of prime interest to laundry and cleaning establishments, and utility companies.

A certification mark is "a mark used upon, or in connection with, the products or services of persons who are *not* the owners of the mark, for the purpose of *certifying* regional or other origin, material, mode of manufacture, quality, accuracy, or other characteristics of such goods or services." Or it can indicate "that the work or labor on the goods, or services, was performed by members of a union, or other organizations."

A collective mark is a trademark or service mark used by the members of a cooperative, or association, or a mark to indicate membership in a union, an association, or other organization. Hence a mark used by a trade association or farmers' cooperative to distinguish the products of their members, is a collective mark, provided the association, cooperative, or union *per se* does *not* sell the products.

The Supplemental Register

This register will be of interest primarily to those companies wishing to take out foreign registration. This register is "a continuation of the register provided in....the Act of March 19, 1920." The purpose of this 1920 Act, when passed, was to permit the registration of "all other marks not registerable under the Act of February 20, 1905," except a few groups absolutely prohibited by both. Bona fide one year use in interstate commerce was thus the only significant requirement. While the intent was laudable, i.e. to secure registration in the U. S. of marks that could not qualify under the 1905 Act, and thus meet a requisite for obtaining foreign protection of the mark, the result has become as one authority puts it: "a collection of purely descriptive words, geographical names, generic words, and the like,

(*Continued on page* 200)

Managing a research department has something in common with driving an automobile, according to the author. There are three important controls in either case—steering wheel, accelerator and the brake. Here the cartoonist shows how not to run things.

Managing A Research Department

Personnel administration places first among functions exercised by head of research laboratory, whose responsibility starts with the selection of his staff. Other functions are business management, research direction

By A. G. OLSEN, Manager, Central Laboratories
General Foods Corporation, Hoboken, N. J.

PROGRESS in a research organization depends on the caliber and morale of the staff. Therefore a most important function of the manager of research is to maintain these on the highest possible level. This makes personnel administration the number one function, if not actually the most important function of research management.

Two other essential functions are obviously business management and research direction. The knowledge of the details of business management can and must be acquired, but the basic horse sense that goes with it is not easily acquired. It should be in the man to begin with.

Ability in the third function, research direction, is of course essential but that does not mean that the director must be a specialist in each field of research under his direction. Competent ability in specific fields can be hired as the manager delegates more and more of his duties to his supervising staff.

That brings us back to the first point again—that research management responsibility starts with the selection of the staff and the responsibility for maintaining the morale of that staff at a high level is one that never ends.

Choosing the Staff

It has been said that to raise your children properly, you have to start with the selection of their grandparents. Likewise, to assure a steady flow of successfully completed research projects, you have to start with the selection of your personnel, making sure that their scholastic, personality, and experience background is such as to assure successful cooperation in the research program.

Research workers have all the human frailties that other human beings have, and the larger the organization, the more essential it is to select not only capable men, but men that can work as one of a group. Team work is the basis for large scale research accomplishments, and that makes the human relations factor of far more importance than professional knowledge when it comes to selecting additions to the staff.

With the right staff selected, it is essential that everyone in the research organization know exactly what his job is. That includes the assignment by the manager of both responsibility and the necessary authority for functioning properly. If the man assigned the responsibility for the job cannot be trusted with the right amount of authority, it indicates that a wrong selection was made in the first place.

It is good practice to draw up an

organization chart showing what you think you think you have, such as the somewhat idealized one reproduced in this article. Usually the actual functions must be assigned on the basis of the available personnel and the utilization of the best person available. In our own laboratory, the manager doubles as Director of Applied Research, and the assistant manager doubles as Director of Basic Research.

Our Applied Research group comprises three divisions: Engineering Research, Food Technology, and Applied Physical Research. Each is headed up by a qualified director. Under each director are several sections working on specialized assignments as, for example, Packaging Section, Analytical Section, Chemical Engineering Section. The Basic Research Group is similarly divided and subdivided. The three Basic Research divisions in our laboratory are: Organic Chemistry, Biochemistry, and Physical Research. It may be noted that the laboratory is organized functionally rather than productwise.

Actually, some groups tend to become experts on specific products because the majority of the problems pertaining to those products fall within the scope of the activities of one research group. The assignment of each project is nevertheless made on the basis of whether it is essentially an engineering, or a physical research, or maybe a biochemistry problem. In each case the other specialized divisions of the laboratory contribute to the project on a service basis with the division carrying the major responsibility also retaining the over-all responsibility for utilizing the specialized assistance available in other divisions. It is, of course, a laboratory management function to assure the necessary cooperative efforts, and to assign priorities whenever more than one project calls for a specialist's time.

Management Responsibility for Progress

"You see," explained the Queen, "it takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!" When the Queen explained that to Alice, she also provided the basic reason for the existence of research laboratories, which is to provide that extra speed which will push your company out ahead of competition. Average efforts leave everyone in the same relative position.

In research, as in any other activity, you can have lots of action without getting any place. The most important management function in a research department, therefore, is to see to it that there not only is a lot of activity, but that there is real progress. Details of management technic will differ depending upon the nature of the business, the size of the laboratory and many other factors which differ from one laboratory to another.

Three Basic Controls

I like to think of the job of managing research in the terms of driving a car. There are three basic control functions the driver exercises; three special gadgets he uses: (1) the steering wheel, (2) the accelerator and (3) the brake pedal.

It is worth noting that to exercise these three functions, you need not know in detail everything that goes on under the hood. You can even get along without knowing all the principles of combustion, engine operation, and power transmission. You do, however, need to know how to recognize mechanical trouble before it interferes with progress and to know who does an expert job of fixing. You do need to know whether you have enough gas to reach your destination, but even more important, you have to know your destination, the road conditions, and whether your car actually is capable of taking the grades you will encounter.

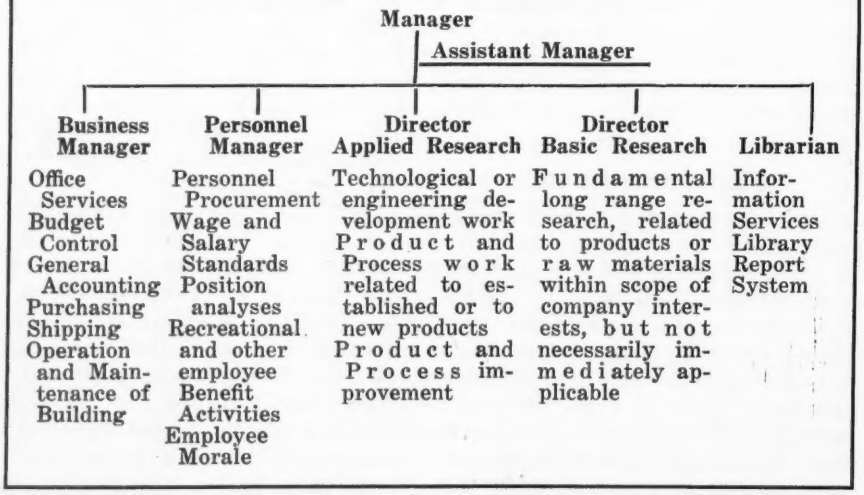
If it is completely new country you are going into, you must know enough to visualize all the difficulties and provide for possible emergencies before you start. It may be disastrous to have them take you by surprise after an expensive start. The same is certainly true in the running of a laboratory.

You cannot run research without budgeting expenditures commensurate with the size of the objectives, and you must have a clear conception of these objectives and at least a general idea of how to reach them. Even in basic research, I doubt that it is ever worth while to set out to investigate a given area of interest without first setting down definite objectives. To do otherwise is too much like the vicarious ramblings of a Sunday afternoon drive in the country. I admit the latter has its attractive points, but the afternoon is likely to be more successful if well planned in advance.

Budgeting and Planning

Research is a commodity for sale. Whether it is done in an independent consulting laboratory or in a laboratory established by your company, it should be evaluated and purchased on the basis of a reasonable business adventure. The objectives and the cost should be balanced one against the other. If the cost is too great considering the possible benefits, there is no justification for going ahead. This seems so simple and obvious that it should not need to be mentioned, but, nevertheless, it is often overlooked. It is not uncommon to have $1000 worth of research *proposed* to gain a $500 advantage. Laboratory management must be alert and apply the brakes to that kind of proposal in order to conserve facilities and manpower for more profitable activities.

Research Department Organization Chart



This is an idealized organization diagram for a research department. The Central Laboratories set-up of General Foods Corp. follows this plan, with some dual duties. The manager acts as director of applied research, while the assistant manager directs basic research.

I do not mean to imply that commercial research should not include long range basic research with no immediate applications in view. The value of all research can obviously not be measured in terms of immediate financial or competitive advantage. The accumulation of a background fund of general knowledge, the building up of laboratory prestige by publication of scientific contributions, require the expenditure of research time that can be justified from both a corporation and a staff morale point of view. It is, however, just as essential that these activities be well planned and budgeted. They should not be permitted as haphazard individual activities on time borrowed from bread-and-butter research.

Steering and Scheduling

Recently a friend told me that I might be on the right track, but I would still get run over if I sat there too long.

The frequent patent interference suits are good examples of what may happen to well planned research if it is stalled on the track until a competitor working for the same objective overcomes what may have been an initial advantage. The same is true, of course, of non-patentable developments.

It is a management function of major importance to schedule research and keep the research group moving steadily toward the objective. If an answer is needed by July, it is necessary to schedule the component parts of the project in such a way that the final answer will be forthcoming by July. This means the assignment of the necessary man hours and constant checking on progress.

A necessary characteristic of a research worker is a healthy curiosity. A natural by-product of that is a tendency for him to want to investigate all the interesting phenomena that occur in connection with his work. Assuming that definite objectives have been assigned, it is obvious that progress will be slowed down, or even a quite different objective reached if this natural curiosity is not kept under control. Such control is necessarily a management function.

It is quite possible that more valuable contributions may be missed by not following the leads whatever the direction; however, the only practical way of conducting commercial research is to keep the major objectives steadily in mind and not permit the individual to get too far off the track.

Meetings and conferences help the manager of the research department to exercise control over the course, the cost and the rate of progress of the laboratory's investigations. This is the weekly staff meeting of General Foods Central Laboratories, attended by heads of major laboratory divisions. Present are, left to right, R. E. Kremers, assistant manager; H. M. Barnes, director of the organic chemical laboratory; A. G. Olsen, the manager; J. V. Slade, business manager; H. K. Mure, director of the biochemistry laboratory.

Those individuals who cause management most concern by chasing a lead up an alley-way that obviously is not in the direction of the assigned objective are not necessarily less desirable than those that keep their eyes constantly glued on the target. An intense curiosity and a mind that notes and questions everything unusual are, as already mentioned, prime requisites for a successful research chemist, and many of these side observations should be noted for later attention after the primary objectives have been taken care of.

From a management standpoint, the only sin committed by too much time spent on interesting side issues is interfering with the time schedule for reaching the assigned objective.

Looking Ahead

According to the Good Book, it wasn't raining when Noah built the ark. The fact that he built it when he did prevented what later would have been a disaster to the Noah family.

In politics it sometimes pays well to permit or even to create emergencies for the very purpose of being on hand and getting the credit for rescuing the country from the effects of those emergencies. On the other hand, I have been told that the best power plant engineer is the one that finds the most time to sit down doing nothing. It proves that he has everything under control. Unfortunately, a short-sighted management might, and sometimes does, get the idea that he is just plain lazy.

Recently T. J. Curtis of the Monsanto Chemical Company pointed out that it is the job of management to hold emergencies in a given company to an absolute minimum. This is particularly applicable to laboratory management.

Kettering very aptly said, "If you wait until it is needed, it is too late to start research." Laboratory management must visualize emergencies before they arise and be ready with changes in processing, in raw materials, in products so well in advance of actual needs that the answers are ready when they are needed.

During the war changes in availability of materials were so frequent that often substitutes had to be provided for previously provided substitutes that suddenly had become scarce, sometimes even before they could be put to use.

By looking ahead, some of our products that otherwise would have been off the market remained profitable items, and at least some of the substitutes proved superior to the original materials.

Management Technics

The driver of a car is guided in his use of the steering wheel, the accelerator, and the brake by the communications system installed on the dashboard. If he is a good driver, he notes the speed, the mileage, the temperature of the radiator, and acts accordingly. The manager of a laboratory needs a reliable communications system for his guidance. This includes everything from formal scheduled reports to casual conferences. In our re-

search department the following are in regular use:

1. **Weekly Staff Meeting**
   This meeting is attended by the heads of the major laboratory divisions, both research and administrative. Each in turn reports accomplishments and other matters of management concern during the week. The manager, in turn, reports changes in management policies and other developments of importance to the group. The purpose of this meeting is informational; detailed discussion of the research program is not permitted.
2. **Research Conferences**
   (A) Project Committee Meetings are scheduled at intervals for the purpose of discussing research programs with the heads of merchandising and production groups concerned with or actually sponsoring research in the laboratory. These meetings constitute a major instrument through which research and merchandising objectives are coordinated by exchange of ideas, plans, and other information between research management and the merchandising and production executives concerned. Sales and production plans are discussed and research objectives and budgets are agreed upon.
   (B) Regular conferences are scheduled each week between the manager and the head of each major research division. These meetings serve the dual purpose of giving the manager a picture of the current status of each major problem and of providing management guidance and decisions on any matter affecting the program.
3. **Research Report Systems**
   (A) Monthly Progress Reports briefly summarize the progress during the previous month, keep both laboratory management and sponsors in touch with all current developments. They serve as indicators of both action and inaction. These reports are preferably brief and relatively non-technical.
   (B) Formal Project Reports serve mainly the purpose of fully recording and passing on the complete and detailed research accomplishments. These are normally prepared at the completion of any major segment of an assigned project. Lack of adequate reports may necessitate the duplication of much tedious work at a later date.
4. **Budgetary Control**
   (A) Project authorizations are prepared on the basis of a well outlined research program. The heads of research divisions are authorized to proceed only within the limits of the authorized funds and the scope of the objectives given.
   (B) Monthly cost statements from the business office show the cost of each project based on direct time and materials charged to that project. These provide essential information to both the manager and those in charge of the projects.

The above are just a few of the tools essential to laboratory management. They are admittedly based on practices in a moderately large laboratory and might need modification in order to fit small establishments. I am sure, however, that the principles involved can be applied successfully to any size laboratory. They do not and should not replace day-to-day informal personal contact between management and staff, important in any organization, regardless of size.

Choosing A Research Director

Five qualifications count—including managerial ability, spirit of enterprise and personality

By THOMAS M. RECTOR, Vice-President in Charge of Research, General Foods Corporation

Dr. Olsen's article tells how the director of a large research laboratory functions. Here T. M. Rector, General Foods vice-president, tells how to select the director.—The Editors.

In selecting a research director we can assume that we start with a man endowed with a good educational background, personal integrity, good moral character and good health. His other qualifications for the job can be discussed under the following five headings: (1) Technical proficiency; (2) managerial ability; (3) ability to cooperate; (4) spirit of enterprise and (5) personality.

Technical proficiency includes technical training and experience in the particular field in which management wishes research done. In a very small organization, it is highly important that the director have in his own right broad experience and training in the field. In larger organizations, technical proficiency may be subordinated to some of the qualities to be discussed later. It appears to be easier to hire highly specialized technical proficiency than the combination of other qualities necessary to the man who heads up a research organization.

Managerial ability in a research director is highly essential because the direction of research is a managerial job. Probably more research directors fail for lack of realization of this fact than for any other reason.

Research and development in a corporation is a service function and must accomplish its objectives by cooperating with the other departments of the business. Therefore, it is highly important that the research director have the ability and willingness to cooperate.

The research director badly needs the drive which makes him want to see the results of his technical staff translated into business results. This drive causes the capable research director to learn as much as he can about the functioning of business without sacrificing technical proficiency. Without this knowledge, it is not practical for the research director to exercise much initiative. He becomes a problem solver who can solve only problems presented to him as such. The good research director not only can solve the problems of others, but finds problems in every department of the business to be solved and then finds the solution. For want of a better term we have called this quality the "spirit of enterprise."

Our experience has been that the term "personality" which means so many things to so many people is probably the most important single qualification point. When a young technical graduate is hired by a research organization, there are about two chances out of three that if he fails it will be because of personality traits. There are jobs in research organizations for almost all degrees of ability, but no job for any man with markedly poor personality traits.

EDITORIALS

LAURENCE V. BURTON, Editor

Victory Gardens in 1947

IN Minneapolis-St. Paul, a recent check on the number of victory gardens showed that 75 percent of last year's gardeners were at it again. Two checks in New York suburbs showed 81 and 97 percent of last year's gardens were going strong.

Time for More Planning

IN conformity with the forward planning for national defense—just in case—it is advisable for every food processor, as well as all other manufacturers, to devise his own plans. Also to put them into action when it becomes possible.

A part of the national plan is to stock-pile certain scarce materials that must be imported in quantity if we are to have any at all. For the moment this aspect can be left to the government. In this respect there is hope that the stock pile will be in existence—not merely a blue print for the future when, as, and if, Congress appropriates the money.

But the food processor, himself, has an obligation to do something. His plants should be modernized to whatever volume of production he can sell. He should have plenty of repair parts, piping, valves and fittings, and especially motors, starters and switch gear. His shop should be well equipped to make repairs or even build what equipment he may need but cannot purchase.

All of this will be predicated, of course, on a company plan drawn up by the tops in every company. The big idea is to have every food plant in the country ready for any sort of a national emergency that may develop.

To Increase Farm Prices?

AT last Washington is becoming concerned about the high prices of farm lands. Until May, 1947, inquiries addressed to high officials and cabinet officers always brought forth the same general answer: that all is well; that farm mortgages are at the lowest level recalled; that agricultural prosperity is now at an all-time high. But the official position is now changing.

In our humble opinion, it is time to change. The welfare of the nation demands a prosperous agriculture—anybody who knows much about business understands that. But to extend further credit to the most prosperous segment of our economy will not, in the long view, maintain that prosperity. Yet, this is the very thing that Representative Clifford Hope wants to do in his bill to permit Federal Land Banks to lend up to 75 percent instead of the present 65 percent of a farm's appraised value. Coming at a time when the need is for lowered food prices, the Hope proposal would be a move in the wrong direction.

By narrowing the owner's margin of equity in farm lands, the net effect will be to attract too much unwise city money. One of the strange phenomena of recent years is that city folks are the ones who keep farm lands at prices that are above the reach of most dirt farmers who have no other source of income than what their farms can produce.

Food processors who buy direct from farmers have a direct interest in prosperous farmers. Those who have had such direct dealings know that it is more satisfactory to buy farm produce from farmers who are not loaded down with debt. Debt-ridden farmers are usually the ones who bring in the poorest raw materials, who lack the equipment and facilities to care properly for their growing crops, and are everlastingly scheming to cut the corners, violate contracts and conceal product inferiority.

Farm land prices that are too high will eventually lead to undesirable economic conditions in agriculture and all their attendant evils, except for the few who resist the desire to speculate in farming when it happens to be easy to get into debt. We believe that a down trend in farm land prices is in order and will contribute more to the good of all than further inflation or even a continuation of present prices.

Peculiar Problem of Unmixing

ONE of the more unusual problems of controlling quality that is periodically rediscovered by more alert production men is the strange phenomenon of unmixing. It is not very common and occurs only under special conditions, sometimes right in the mixer when it is running!

In general, unmixing occurs under the following conditions: (a) Where ingredients have densities that differ materially; (b) where ingredients are granular or free flowing solids.

It is usually first discovered when the sample for analysis is very small, or when the analytical procedure is very exact.

The most extreme case we could imagine would be to attempt producing a uniform mixture of dry beans and ping pong balls in any sort of mechanical mixer. While nobody would be likely to attempt such a mixture (and we can foresee no reason for wanting it uniform), the perplexing unmixing has been noted in the manufacture of baking powder, fruit for salad, in glass manufacture, and in the production of electronic cores for special equipment (where the mixing problem involves a powdered plastic and iron powder).

In addition to the foregoing problems of unmixing in the mixing machine, there is another source

of unmixing trouble. This occurs when the product is drawn off from the mixer and falls in a steady stream to form a cone-like pile. The heavy components roll to the bottom of the incline while the lighter ones tend to remain nearer the top of the cone, thus producing non-uniformity. A very common place where this occurs is in the handling of the finer preparations of coal. The highest percentage of ash will be found on the outside of the bottom of the coal pile.

Although Food Industries reported on unmixing in October, 1933, most readers have forgotten it. If enough of you want us to republish the report we shall be glad to do so. Just send a postal card to the editors if you want to have another chance to read it.

Some Middlemen Are Inexcusable

TWO things happened in a single recent week that show the complete lack of conscience of some people. A retail dealer in Chicago was selling bananas by the pound at 25 cents, equivalent to $1.50 a dozen. And at the same time United Fruit Company was advertising in the daily papers it was selling the fruit at 5½ cents a pound seaboard, southern ports. The company cannot under the law fix resale prices, but deplores excessive retail prices.

A roofing manufacturer whose prices had risen only 19 percent over prewar discovered that some of his dealers had been charging between 200 and 300 percent over prewar prices.

There is no justification for either price hike, and gouging of that sort will bring its own unhappy correction. Trouble is that the correction of that type of characterless pricing can create conditions that may bring woe to everybody.

Why Foremen Start Unions

To the non-industrial public, and even to many people in industry, there seems to be no rational reason for the rise and growth of foremen's unions. But there is a very potent reason: and that reason is neglect. Top management is usually the unwitting cause, by centering all its attention on worker problems, unions, compensation, bargaining and strikes, without giving enough thought to what goes on in the next higher levels of authority and responsibility.

In talking recently with the executives of a big auto company about the reasons why the foremen's union started, it sounded exactly as if they were in the food processing industry, for their stories were a close parallel. The reason in both cases has run like this: Worker's pay with all its overtime, bonuses and the like, first approaches; then begins to equal; then grows larger than a foreman's pay. The foreman, being just as human as the worker, wonders what's the use.

Why all the grief and responsibility for less money than the guy who punches a time clock? An individual foreman can squawk, but management, harried with union troubles, is too often likely to postpone serious consideration of his complaint. Then the foreman has three alternatives: He can quit. He can get a job as a worker and earn more money with practically no responsibility. Or he can join with other foremen to gain the possible advantage of collective action. In the latter alternative he can compel attention to the inadequacies of foremen's pay that have arisen since the war started.

After the preceding moves come the belated debates on whether a foreman is a part of management. The argument runs that he is a part of management and, therefore, should be forbidden to unionize or strike. If that were the whole story it would be convincing. But it omits the compensation aspect. And a love of power or need for more cash are the only valid reasons for assuming greater responsibility than ordinary labor.

If the compensation to a foreman is not sufficiently more than a worker's pay to give prestige to the job, as well as reward the greater responsibilities, the foremen's union is the next step. And to our way of thinking there is nothing more pathetic, nothing that will wreck morale more than a group of labor bosses carrying placards on a picket line trying to persuade the workers not to cross the line.

If management is alert it will review foremen's pay and take the necessary preventive steps. It is easier to prevent than to cure this trouble.

Single vs. Multi-story Plants

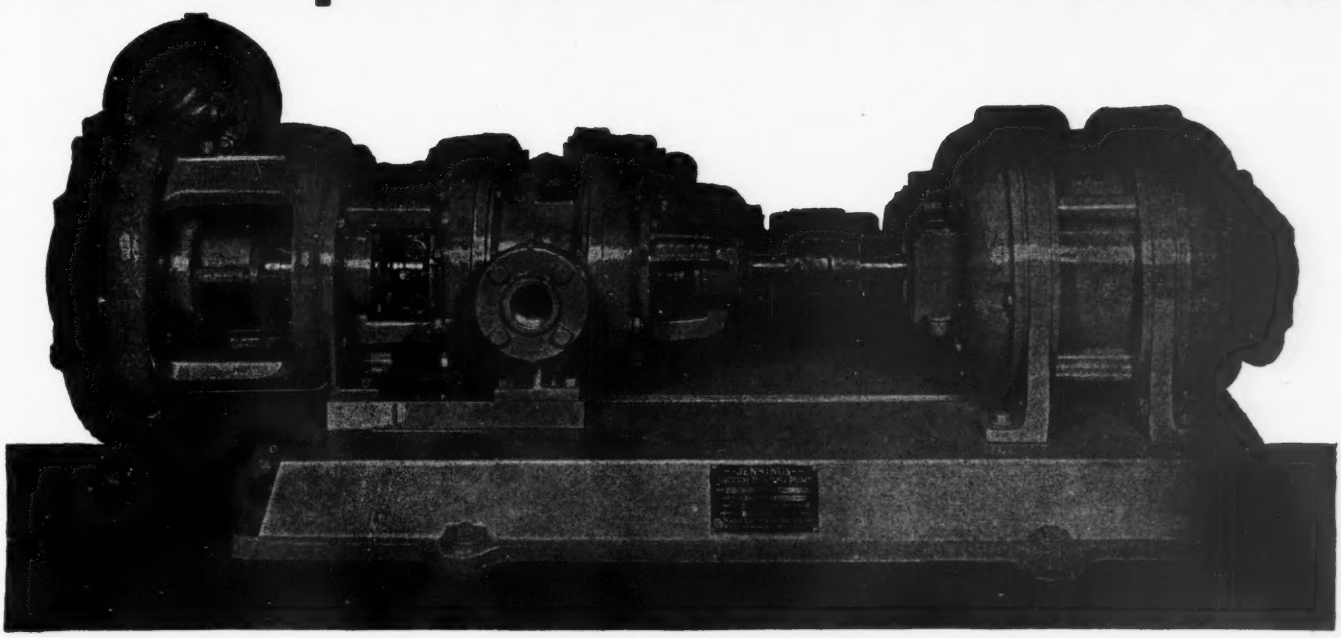
AN unusual factor that decided the design of a single story plant instead of a multi-story plant has been brought to light. The tops in a company had sought Food Industries' advice on the matter and we had explained the relationship of higher supervisory costs to interest on ground area costs. The president, it seemed, favored a single story structure but some of his directors were determined to have a multi-story plant.

For a time it looked as if the 4-story building would win, until the factory architects showed that the new location was in a No. 1 earthquake area, that it would cost an extra $400,000 to "earthquake-proof" a 4-story structure. Immediately the directors were in favor of a single story plant.

Food Technologists Meet Emergency

FOOD technologists need to, and can, cope with any sort of an emergency, like one that occurred at the Boston convention of the Institute of Food Technologists. Some 600 conventioners were waiting at Rowe's Wharf to go by steamer to the clam-bake at Gloucester when the steamship company decided to cancel the trip. In an hour a special 10-car train had been arranged, a fleet of buses engaged at Gloucester, and the clam-bake came off on schedule.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

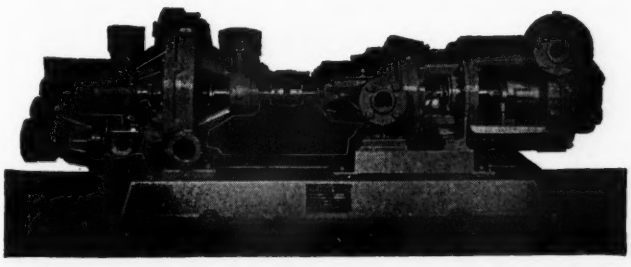


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK • CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Frozen at Sea

PRODUCTS of the initial voyage of the trawler Deep Sea should soon be appearing in local markets.

Said to be the first ship of its kind, the Deep Sea is designed to catch, clean, steam-cook, pack, freeze, package and store fish at sea. Her owner, Deep Sea Trawlers, Inc., Seattle, expects to catch about 200,000 lb. of fish during a 6 to 8 week voyage. King crab will take up about 95 percent of the pack, the remainder being sole and lemon sole.

King crab has received little emphasis among American fishermen. The Japanese and the Russians, however, have developed rather important king crab industries in recent years. The crustacean is found in profusion in Alaskan waters. It often runs as large as five feet, claw to claw. Its meat is not as firm as lobster nor as oily as crab.

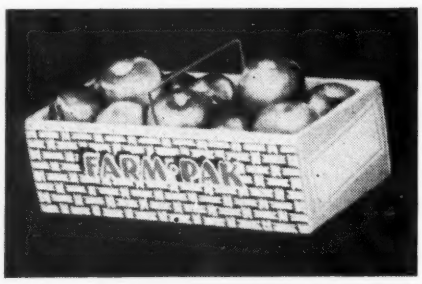
Following the catch, the male crabs are sorted and cleaned, steam-cooked, the meat shaken free of the shell, washed in fresh water, inspected, weighed, packed in freezer trays, frozen in a continuous quick freezer, packaged in aluminum foil and stored in refrigerated holds. Thus the solid crab meat, as well as fillet of sole, lemon sole or flounder can be completely packaged and readied for marketing aboard ship.

The seafood will be distributed under Wakefield's Ocean Frosted label. Net weight is 12 oz.

To Market, To Market

RESEARCH by The Ohio Boxboard Co., Rittman, Ohio, has resulted in a "Farm Pak" basket which provides a practical means of packaging and at the same time enhances the sales appeal of fruits and vegetables.

Produced in three sizes, 4, 8 and 12 quarts, Farm Pak is made from tough corrugated board printed in red and green with a basket weave pattern. Space is provided on the end panels for the grower's name, address and product identification.



Blanks are die cut, reinforced by staples where the wire handles are to be inserted, and shipped to the grower flat. The basket is set up by five single folds and the insertion of the handle, which lays flat on the basket or can be pulled up for carrying.

The basket has been found suitable for packaging apples, peaches, plums, pears, grapes, tomatoes, cucumbers and many other types of farm produce. It will withstand 500 pounds pressure when stacked into mass displays.

Consumers should like its attractiveness, durability, handiness and reusability.

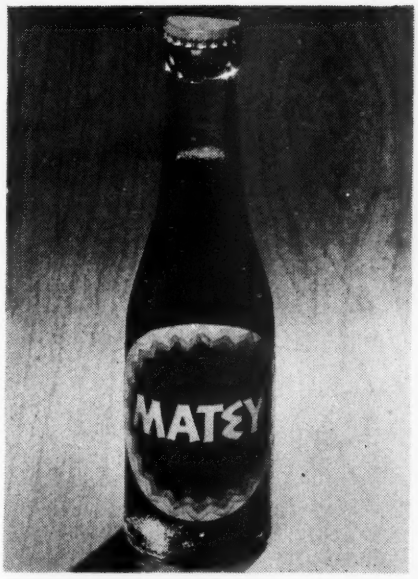
Meats

GEO. A. HORMEL & CO., Austin, Minn., has put a group of new canned meat products into national distribution.

Quarter hams, weighing 1 lb. 8 oz., are packed in D shaped cans that are an exclusive copyright of the company. The regular ham cure is used. This consists of 3 weeks' cure to bring out the true ham flavor. There is no shank meat in the can and the fat covering is limited to a quarter of an inch. Each can contains a solid piece of meat and the pack is sterile so that it can be kept for an indefinite period without refrigeration.

Hormel packs Vienna sausage in a ½ size can. Exclusive of water, in which they are packed, the links weigh 4 oz. net. The Viennas are stuffed in sheep casings for more juices and better flavor.

Among the company's new meat spreads are Liver Pate, Deviled Ham, Deviled Tongue and Deviled Meat Food Products. These are packed in 2½ by 1½ inch tins. Net weight is 3 oz.



That Latin Touch

A NEW soft drink, containing *maté*, the national beverage of Brazil, is being test marketed in the East.

Looking for something entirely new in the field, Matey Company, New York, decided to use *maté* as a basic ingredient, since it contains stimulating but harmless properties and has been used successfully as a nutritious balance to the canned meat rations of the Brazilian and Argentinian armies. Other ingredients include natural fruit juices and sugar. There is no synthetic flavoring in this drink. Preliminary tests showed a wide acceptance for its palatability.

Distribution will be through franchised bottlers. The product will sell at five cents for a 7 oz. bottle.

The company has coined its product name, Matey, from the Latin *maté*. The Latin-American touch is kept in the label design—simple, yet distinctly different and brightly colored.

Advertising pieces will feature a cartoon sailor and two slogans, "Hi, Matey, try Matey" and "Matey's yours for life."

No Browning

AN aid to freezing and canning has been placed on the market in time for the present canning and fruit freezing season.

Product of the Beacon Laboratories, New Brunswick, N. J., Freezaid is a pharmaceutical outgrowth of vitamin C research. It is said to prevent browning and flavor loss of all fruits. Composed of 4 percent vitamin C with a citric acid base, it comes in powder form and can be used that way or diluted with water.

During experimental tests at Beacon, fruits have been cut, immersed in Freezaid for 30 to 60 seconds, then left in the sun and air for three days without loss of flavor and with no browning.

Directions for use are simple. One quarter teaspoonful of Freezaid is dropped into each quart of fruit. After sealing, the jar is shaken once or twice so that the powder is distributed through the sugar sirup.

Storybook Fudge

AN effort to produce a fudge mix that would equal home made or good bought'n candy has resulted in a product known as Oz Ready-Mix for Fudge.

Homix Products, Inc., New York, is responsible for this item which, unlike most other mixes, is described as fudge dehydrated. Cocoa, powdered whole milk, sugar, salt and vanillin are blended and made into candy which is in turn dehydrated. The consumer reconstitutes it with boiling water, stirring for three minutes.

The mix is packed in an attractive fiber container with metal ends and pry-up lid. The Wizard of Oz characters look very engaging cavorting about a piece of cake with fudge frosting.

Container makes a pound of fudge, or frosting for two 8 in. layers.

Vacuum Packed Bacon

TO insure freshness of bacon from the time it is wrapped until the housewife uses it, Armour and Co., Chicago, has developed a method of vacuum-packing the meat in a transparent wrapper.

Armour Star vacuum-packed bacon is wrapped in a hermetically sealed transparent film. The package bears the Armour logotype and is printed in cedar red and contrasting white. A large portion of the wrapper is transparent, providing visibility yet protecting the fresh flavor.

Space is provided for the dealer to insert price of the ½ lb. package.

Freezer Jar

ONE of the newest pieces of equipment for home freezers and locker plant operators is a jar specially designed for frozen foods by Ball Brothers Co., Muncie, Ind.

The round jar is of clear flint glass. Its slightly tapered sides are finished with non-slip stippled ribs. The re-usable cap screws on and is made of a single piece of rust-proof metal. A rubber compound in the top of the cap provides an air-tight, leak-proof seal. The top is recessed so that jars stack easily.

Numbered among the advantages of the Ball Freezer Jar are its visibility, leak-proofness, durability, sanitation, applicability, design and rigidity.

To thaw, the jar is placed under cold water.

with SHELLMAR bags and wraps

Statistics prove that savings effected in prepackaging cleaned and trimmed produce more than pay the cost of both package and packaging. Brand identity, longer store life, faster sales, larger volume . . . all are extra dividends that result from this modern merchandising method. The know-how Shellmar has gained through pioneering in the development of prepackaging is at your service. Contact your nearest Shellmar office . . . today.

Sales Offices in Chicago, New York, Cincinnati, Cleveland, Detroit, Kansas City, Minneapolis, San Antonio, Atlanta, Baltimore, Boston, Philadelphia, Pittsburgh, Los Angeles, Salt Lake City, San Francisco, Seattle

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PRODUCTS CORPORATION
MOUNT VERNON, OHIO • SOUTH GATE, CALIF.
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PACKAGE MANUFACTURER - PRINTER - LAMINATOR - CONVERTER . . . CELLOPHANE - PLIOFILM - ACETATE - SARAN - VINYLS - FOILS - PAPERS - COATINGS

Carton News

FIRST packed in a printed cellophane bag, then in a folding carton with no visibility to the product, Rockwood's Mint Wafers now appear in a unique oval carton which provides a view of the candy as well as a transparent cellulose overwrap.

A sheet of laminated glassine paperboard is cut so that when it is bent egg carton fashion, it forms two vertical tubes whose diameter is just the right size to hold the wafers with a minimum of breakage. The lamination prevents grease from staining the carton and likewise protects the chocolates from off-flavor due to untreated paperboard. The bottom flap is glued—the top tucked in with a tab for easy opening.

Just one color is used, bright green for the mint wafers and brown for rum. The design closely adheres to the recently adopted Rockwood style. Notable in its simplicity, the package is free of all extraneous printed matter. It leaves no question at first glance that the brand is Rockwood's and the product mint wafers.

The package is ideally suited to present-day merchandising. It is sturdy, easy to handle and will stand the gaff of the supermarket.

Product of Rockwood & Co., Brooklyn, N. Y., its net weight is 13 oz.

Good Gravy

CONTENDING that good gravy is hard to make and that most housewives don't like to make it, Maggi Co., Inc., New York, has come forth with a "so quick—so easy to prepare" gravy.

Maggi's Gravy Powder consists of meat extract, hydrolyzed plant proteins, potato starch, wheat flour, salt, beef and bacon fat and flavor.

HUBBERT

Manufacturers of Fine Kettles

All Hubbert Kettle Shells are seamless, die drawn from one single sheet. Shells have no welds to crack, corrode, contaminate or leak

SEAMLESS SHELLS

SUPER QUALITY

EFFICIENT

SANITARY

DURABLE

SAFE

Hubbert Seamless Drawn Steam Jacketed Kettles are *first* choice with the nation's *finest* Food, Chemical and Drug Processors.

Tanks

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Special Equipment to *Your* Design in *Stainless Steel* . . *Nickel* . . *Monel*

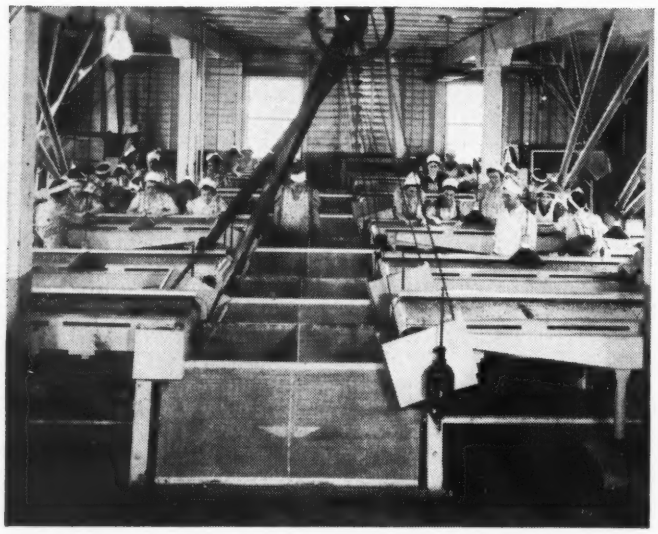
Hubbert Kettles built to ASME & CANADIAN Codes. Request certificates when ordering.

B. H. HUBBERT & SON, Inc., 1311 South Ponca St., Baltimore 24, Md.

CANNERS LIKE CROWN SERVICE...

Mr. H. A. Verhulst (right) president of the Calumet-Dutch Packing Co., Sheboygan, Wisconsin, conferring with Al. Stafford (left) Chicago District Sales Manager of the Crown Can Co.

CALUMET-DUTCH PACKING COMPANY QUALITY PACKERS FOR 26 YEARS



Pea Inspection Room of the Cedar Grove, Wisconsin, Plant. Peas are the largest pack. Corn, beets and carrots are also canned.

Cedar Grove, Wisconsin, Plant, pioneered in the packing of whole kernel golden corn in Wisconsin.

Brillion, Wisconsin, Plant, erected in 1922. This plant today is enlarged and modern in every respect.

ONE OF A SERIES FEATURING CROWN CAN CUSTOMERS

CROWN CAN

THE NATION'S THIRD LARGE SOURCE OF SUPPLY

CROWN CAN COMPANY • PHILADELPHIA • Baltimore • Chicago • St. Louis • Houston • Orlando • Fort Wayne • Nebraska City

FOOD INDUSTRY NEWS

GENERAL

Sanitation Plays a Major Role At Cereal Chemists' Convention

Results of research studies on milling and baking technology are also reported at annual gathering in Kansas City

ACCELERATED interest in milling sanitation problems, reports of research studies on enzyme activity and malting procedures, starch chemistry, agronomy, milling technology and baking technology as well as nutritional aspects of cereal processing was evidenced by the all-time high registration of 642 at the 32nd annual meeting of the American Association of Cereal Chemists in Kansas City, Mo., May 19-23.

Clyde M. Christensen, University of Minnesota, St. Paul, Minn., speaking at Symposium on Sanitation discussed the relation between the temperature increase in stored wheat and corn and the rate of mold growth. The studies showed that as the moisture content of the stored grains increased, the mold growth was more rapid with a corresponding increase in temperature of the grains.

Fumigation of flour with methyl bromide produced objectionable odors when over-fumigation occurred, according to Paul J. Hermitte, Kansas State College, Manhattan, Kans. This condition seems to be due to a chemical reaction between the protein content of the wheat and the methyl bromide. Flour of low moisture content (under 13 percent) was found to have a higher rate of absorption but a lower rate of retention of methyl bromide than flour of high moisture content. As the flour moisture increased above 17.3 percent, bromide absorption and retention became nearly balanced. Additional experiments showed that treatment of flour with methyl bromide affected the gluten content resulting in bread of reduced loaf volume.

N. F. Kennedy, Corn Industries Research Foundation, New York, N. Y. stated that sanitation problems in corn milling are similar to those of flour milling. Sulphur dioxide in steeping inhibits the growth of molds.

A report of the research committee of the Association of Operative Millers in cooperation with the Millers National Federation was given in part by Warren F. Keller, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

On the basis that present flour mill machinery is responsible for much of the industry's infestation problems, recommendations for improvements in milling machinery were enumerated in this report. Some of the recommendations are:

Roll Stands:

Roll feeders (a) should have an independent feeder drive for each pair of rolls, (b) should be independently controlled, (c) should eliminate all excess housing space, (d) should be self-cleaning, (e) should have uniform distribution of feed on full length of roll and (f) should be automatically self-adjusting to compensate for load variations.

The countershaft on the base should be eliminated, rolls should be easily removable and easily cleaned inside and outside; and there should be an improvement over the present type hopper for better sanitation.

Purifiers:

A newly designed feeder should be self-cleaning, provide uniform distribution of stock over full width of purifier and automatically adjust itself to compensate for fluctuations in load.

Indicators should be installed to show air velocity on the suction side and the space above the sieve should be redesigned to minimize infestation and improve the suction.

All metal construction as well as elimination of all unnecessary ledges is recommended for the machine frames.

The use of open screw conveyors to the purifiers should be eliminated and adjustable metal hoppers used instead. The screw conveyors should also be eliminated in the elevators and boots wherever possible.

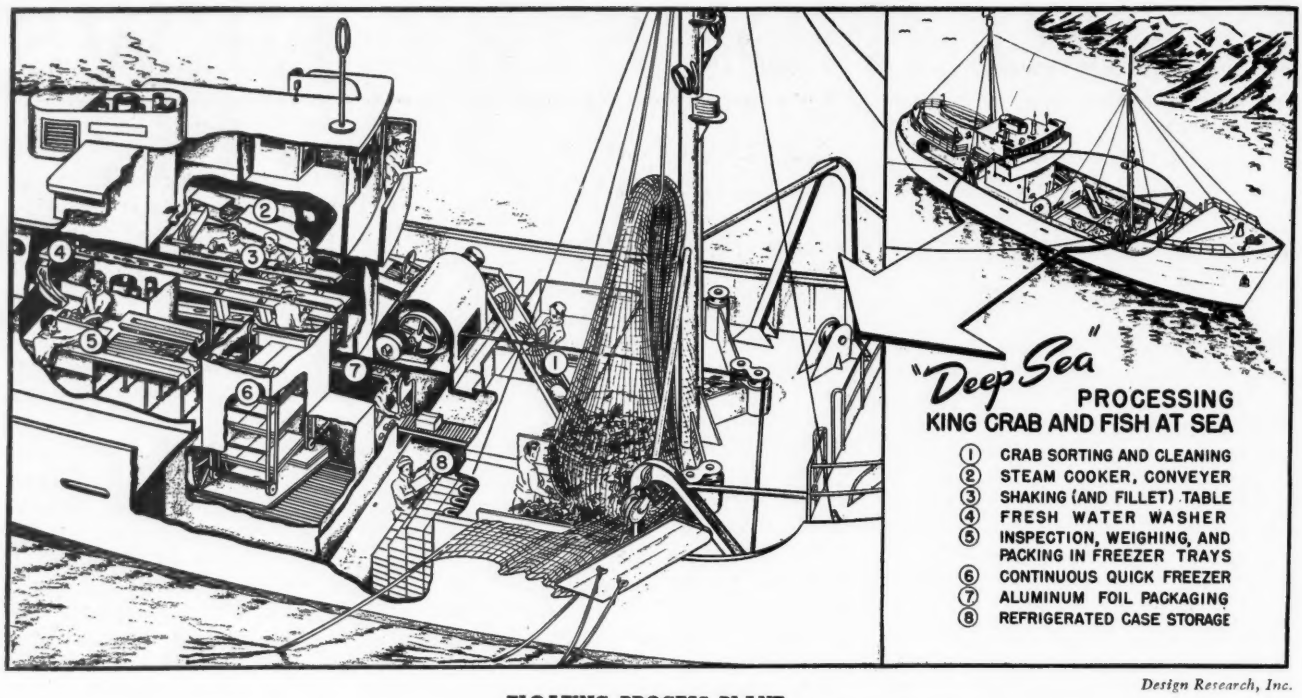
A more satisfactory method for elevation and conveying of mill stocks is needed for the elimination of insect infestation and corrosion.

Robert L. Gates, Kansas State College, Manhattan, Kans., in his report on the preparation of amylase active concentrates from mold bran, stated that acetone is the most efficient amylase precipitant. With all precipitants, optimum hydrogen ion concentration for precipitation is pH 6.0-6.5. The presence of an excess of multi-valent cations in the extract is detrimental to the activity of the precipitate. Isopropanol is the most tolerant in the presence of these ions.

O. C. Beckord, University of Nebraska, discussed the adaptation of the spectrophotometer for the study of starch gelatinization. The equip-

HISTORIC WHEAT CROP

Combines rolling on the Andy Norris farm near Haskell, Tex., are helping to harvest America's historic 1947 wheat crop, estimated at more than a billion bushels.


"Deep Sea"
PROCESSING
KING CRAB AND FISH AT SEA
① CRAB SORTING AND CLEANING
② STEAM COOKER, CONVEYER
③ SHAKING (AND FILLET) TABLE
④ FRESH WATER WASHER
⑤ INSPECTION, WEIGHING, AND PACKING IN FREEZER TRAYS
⑥ CONTINUOUS QUICK FREEZER
⑦ ALUMINUM FOIL PACKAGING
⑧ REFRIGERATED CASE STORAGE

Design Research, Inc.

FLOATING PROCESS PLANT

Designed to process King crab, sole and other bottom fish, while still at sea, the trawler Deep Sea was scheduled to complete her maiden voyage into the Bering Sea, late in June. The 140 ft. vessel, owned by Deep Sea Trawlers, Inc., Seattle, will catch, clean, steam cook, freeze, package and store the catch. The ship's cold air blast freezer will handle 1200 lb. per hour, at —25 deg. F., in a continuous operation. Trays are shaped to freeze the fish in molds that are multiples of the package size, which permits easy cutting to package length. The freezer is insulated with 8 in. of cork. Each of two holds, with a combined capacity of 8500 cu. ft., are insulated with 4 in. of cork. The ship will operate the year round, moving south in cold weather.

ment consists of a U-shaped tube which permits heating and stirring of a starch suspension while it is in the path of the spectrophotometer light beam. The percent light transmitted plotted against temperature gives typical gelatinization curves for starches.

The theory of impact grinding was discussed by Arthur N. Hibbs, Kansas State College, Manhattan, Kans. Centrifugal machines are used to grind the cereals by stages of impact.

Results of studies to determine the effect of various ingredients upon bread staling and tenderness with the use of the Bloom Gelometer were reported by George T. Carlin, Swift & Co., Chicago, Ill. He stated that the addition of shortening up to 3½ percent has increasingly beneficial effects upon the softness or freshness of bread when it is no more than 24 hours old. In bread from 24 hr. to 72 hr. old, the use of 6 percent shortening was found to be most effective in prevention of staling.

The bread having 64 percent water absorption was by far the best. Various ingredients were added to the dough to give it a higher water absorption rate.

J. Freilich, The Fleischmann Laboratories, Standard Brands, Inc., New York, N. Y., in his report on dough oxidation and mixing studies stated that oxygen is essential for proper dough development and that it is most effective when used in the original mixing. When used after fermentation the mixing time is much longer. Fermentation is retarded in the dough until the oxygen is used up because the enzyme action is delayed by oxygen.

The following officers were elected: President, R. M. Sandstedt, University of Nebraska, Lincoln, Nebr.; president-elect, W. L. Haley, Fisher Flouring Mills Co., Seattle, Wash.; secretary, F. R. Schwain, Proctor & Gamble, Cincinnati, Ohio (re-elected); treasurer, J. W. Whitacre, Larabee Flour Mills, North Kansas City, Mo., and editor-in-chief, W. F. Geddes, University of Minnesota, St. Paul, Minn. (re-elected).

Research Projects Gain Despite Economy Drive

FOOD research gains in recent weeks more than outweighed the setbacks that may have been inflicted as a result of the budget slashing drive in Congress.

The Chesapeake Biological Laboratory of the State of Maryland has put forth a plan of cooperative study of marine products derived from Chesapeake Bay resources. The investigations are designed to benefit fishermen, processing plants and manufacturers. Theodore M. Miller, formerly with Foster D. Snell, consulting chemists, will act as coordinator, handling the various phases of study.

The Sugar Research Foundation has made grants amounting to $181,044 for research projects on the role of sugar in nutrition and industrial applications, according to Dr. Robert C. Hockett, scientific director. The foundation is continuing 26 projects for another year and has begun four new projects. The appropriations for grants-in-aid and special studies of the foundation now total $534,160.

A swine research project is being inaugurated at South Dakota State College through a grant of approximately $25,000 from John Morrell & Co. This study will be on the cost, management and marketing comparisons of spring and fall farrowed pigs.

On the adverse side, the elimination of the $54,060 from Interior Appropriations for the operation of Albatross III, the country's only fisheries research vessel, which is nearing completion, leaves that project high and dry just short of any possible payoff on the money already spent. Fishermen hope that the Department of Agriculture's newly appointed Fish Advisory Committee might come up with the answer to the Albatross III setback.

Relaxation on Sugar Answers Many Demands

THE sudden and early end of consumer sugar rationing, while industrial rationing and price control were left intact, was Secretary of Agriculture Anderson's answer to the varying demands in the sugar distribution picture.

Much of the pressure to lift controls has come from the farm women who want sweetener for home canning. City women are not interested because of the high retail price of fresh fruits.

Most industrial users are on record against the early decontrol. They wish to avoid an upward surge of sugar prices just as they are coming into their season of greatest sugar consumption. They are equally anxious to avoid a dislocation of the market that would upset orderly distribution and regular deliveries.

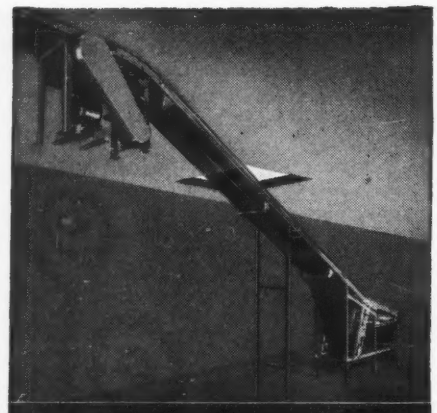
The present easier sugar supply is also evident in the government's relaxations that permit an increase in sirup concentration, the importation of sugar containing products used in the manufacture or service of other products without surrender of ration evidence, and the encouragement of hardship applications. Office of Foreign Agricultural Relations estimated the Cuban crop at 6,000,000 tons as of May 15, up 200,000 tons since March 15. Cuban output is now estimated at over 6,350,000 short tons.

Packers See Red Light In Food Price Decline

PRICE reductions on all preserved foods continue to hold a spotlight all their own as the processors swing into the new season. Possibly the tipoff came from California, when the spinach and asparagus packers canceled or bought up grower contracts. Their reasons were big inventories, buyers' resistance, crumbling retail prices and higher canning costs.

The downward trend was further noted by Paul S. Willis, president of the Grocery Manufacturers of America, who pointed to many items that have already declined below their last OPA ceilings. Lending emphasis to this view was the action of Crosse & Blackwell Co., Baltimore, who announced a substantial price reduction on their line of canned soups. The corn canners also warned of trouble ahead, not only because of general conditions, but because of the high inventories of canned peas, which are bound to affect corn sales.

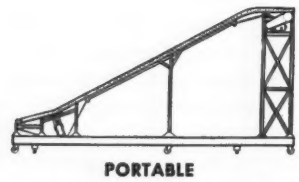
AN OUTSTANDING FAVORITE
MODEL FF
FROZEN FOOD WRAPPER
Because of its new and important advantages, the Model FF has won the hearty endorsement of frozen food packagers everywhere. If *you* are seeking the lowest possible wrapping costs, and a package that has real sales appeal, do not fail to get all the facts about this fast, modern machine.
The FF wraps at the cost-cutting speed of 100 packages per minute. It handles a wide range of sizes, and can be adjusted for a different size in a few minutes. Handles any type of wrapping material used for frozen foods, including foil. Any wrapping material that you may be using on another make of machine can be used on the FF, because its electric eye can register from any point across the entire web of the paper roll.
Food may be wrapped before or after freezing. Its spring-mounted elevator well permits variations up to 3/8" in the size of packages being wrapped. Handles open trays as well as cartons, and the type of end-fold it makes places the end-printing on the *top flap* of the fold, thereby adding to appearance and legibility.
Virtually a single unit, the FF can readily be transported from one locality to another—an advantage in handling seasonal packs.
Write our nearest office for information on the FF or assistance in solving any wrapping problem.
PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts
30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Ave., Cleveland 15 • 849 Marietta St., N. W., Atlanta 3
509 17th St., Denver 1 • 443 S. San Pedro St., Los Angeles 13
320 Market St., San Francisco 11 • 18 Dickens Ave., Toronto 8
PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines



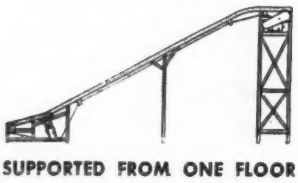
THIS STREAMLINER 30° INCLINED BELT CONVEYOR

SPEEDS
FLOOR-TO-FLOOR
MATERIALS HANDLING

It operates either up or down at a constant speed of 45 feet per minute. Rollers can be "SET HIGH" for oversized packages, or "SET LOW" to provide a protective guard rail on both sides of the conveyor. Unit, available in standard sizes up to 30" wide, has durable, rough top rubber belt . . . a manual take-up for belt slack . . . may be equipped with free-rolling casters for portability . . . or can be supported from one floor. Write for detailed information today.



PORTABLE



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Our more than 25 years' experience is at your service to help you solve your materials handling problems.

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123 WEST AVE., JENKINTOWN, PENNA.

The more realistic food manufacturers, having foreseen the present situation, will not be too seriously affected. Low inventories in most lines appear to be the answer for them. At least two counter-measures have been offered for those who continued in full tilt production at a time when caution should have been the watchword. One of these is advanced by Congressman Edward T. Miller (R., Md.) who proposes that the excess canned foods be shipped to Europe as part of the relief feeding program. The excessively high distribution costs of such a program, if the boxcar and shipping facilities could be found, only serve to create an even greater problem in the view of most food men.

Another suggestion is the Dorset Plan, offered by J. J. Akston, president of Dorset Foods, Ltd., Long Island City. This suggests that retail foods be reduced by 10 percent and a government subsidy be granted to retailers and wholesalers in compensation for the inventory losses resulting from this reduction. That such a plan is getting the government back into the food business with a vengeance goes without saying.

The poultry field offers one segment of the food industry that is running counter to the trend. Hatchery production is down about 25 percent on a nationwide basis. As a result there is some concern over a possible shortage of poultry for packing, this fall, and for egg production, this fall and next spring. Hatchery men with feed on hand and enough acreage to grow more feed are seriously eyeing the poultry raising business, this year. They estimate that they can recover their hatchery losses in the fall poultry prices.

Science Foundation Relegated to Future

A NATIONAL science foundation is not to be established for some years, if at all. The bill approved by the Senate in May seems destined to languish in the House. Certainly it will not be passed during the present session and there is little chance that it will become the law of the land during the next session.

The proposal to be considered by the House has been scaled down to a $20,000,000 program that bypasses the controversial patent question of last year's Kilgore Bill and makes concessions to those who fear federal domination by splitting authority between a part-time board and a presidentially appointed administrator.

"HERE,—TRY SOME—!"

No pressure remains behind the idea of a government subsidy for research. It could come in a few years if a low level of industrial activity made the idea more attractive.

At present the ideas being hatched in the White House are that industry should vastly increase its research and development work. Tax incentives for industrial expenditures on research and development are being considered as a means of bringing the work to the higher level of activity thought to be necessary for the economic well being of the country. The modernization and expansion of plants to take advantage of the latest technical developments might also be fostered by the same means. Subsidies as proposed in the present legislation are now thought to be for future use as a preferred method of government pump priming in times of depression.

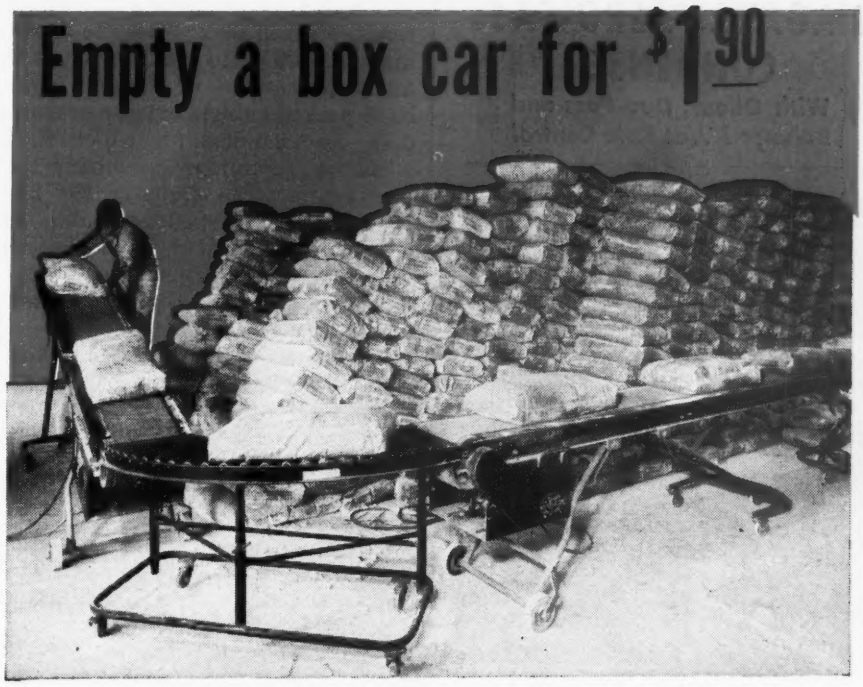
Safeway Still Studies Frozen Food Business

IN a recent bulletin to Safeway division managers, L. A. Warren, president, listed three reasons for the company's non-entry into the frozen food field: Inefficiency of low temperature warehousing, distributing and retailing equipment; lack of "know-how" in the industry, and lack of uniform quality of products.

The bulletin stresses first the unavailability of efficient frozen food retail cabinets. It complains that the original closed cases, still used by most stores, do not meet Safeway requirements since they hide the merchandise from view, make self-service difficult, and are so easily disarranged that orderliness is almost impossible.

Apparently, even the new, open type cases do not meet Safeway standards. The bulletin lists four disadvantages: Low construction, giving inadequate display and forcing customers to stoop; no price-tag space provided; inadequate display per square foot of fixture; inability of such cases to defrost properly and their susceptibility to drafts.

As to the lack of "know-how," the bulletin avers: "...the best minds were right a few years ago when they described the industry as having oversold itself—as having attracted processors who didn't know foods or how to freeze them; distributors who were underfinanced and bought and sold on speculation; equipment suppliers who were not concerned about their engineering background."



former cost $17.10

DIRECT SAVING $15.20

When bagged cement and aggregates were handled by hand truck from box car to warehouse, it required six men working for at least three hours to empty the car and stack the bags. Now, since Rapids-Standard Stevedore, Jrs. have been installed, four men empty a car and stack the bags in half an hour. At 95c per hour this means a direct saving of $15.20 on every car unloaded. And, there are indirect savings in less wear and tear on floors and smaller demurrage charges since freight cars are not held for as long.

H. H. Dickenson Company of Detroit, who operate this system, also use it for handling metal lath, 50 and 100 pound chimed cans of plastics and roofing cement and the many other articles handled by a large building supply house. This equipment paid for itself in direct savings very soon after it was installed and continues to deliver comparable savings every day that it is used.

Rapids - Standard Stevedore, Jrs., Rapid Power Boosters, Rapid - Wheel and Rapid-Roller Gravity Conveyors and Floor-Veyors will save time and money in handling cartons, kegs, cases, bales, cans or packages. Write today for full information on how they can save time and money for you.

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Sales Division — 361 Peoples National Bank Bldg., Grand Rapids 2, Mich.

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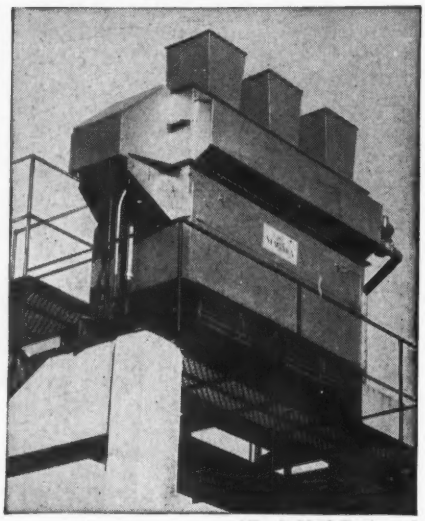
With Oilout, Duo-Pass and Balanced Wet Bulb Control



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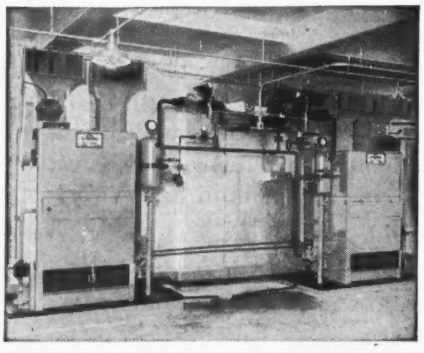
Increases refrigeration capacity and plant production. Saves power and water consumption. Essential exclusive features:

1. "Balanced Wet Bulb Control" holds compressor head pressure at the minimum—saving power.
2. "Oilout" prevents oil accumulation in refrigerant—assuring full capacity.
3. "Duo-Pass" precooling coil eliminates scaling of condenser coils—assures uninterrupted service at full capacity.

Write for Bulletin 101-FI

NIAGARA "NO FROST" METHOD of Refrigeration



With the NIAGARA "NO FROST" Method you always have full capacity with never any refrigeration loss from frosted coils.

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AIR ENGINEERING EQUIPMENT

Striking at quality of frozen foods, Warren says: "Despite warnings and advice to the contrary, too many processors of frozen foods have packed sub-standard merchandise—merchandise for which they obtained premium prices during the war years. The industry has not packed and wrapped according to established practices, with the result that many customers have lost confidence in and ceased to purchase frozen fruits and vegetables."

One ray of light shines from this bulletin: "As far as the Company's future participation in the frozen food field is concerned, we will continue our study and research so that we will have the facts before us which will be necessary to do the right kind of a job when it is felt that the time is right for us to commence the sale of frozen fruits and vegetables."

While it is regrettable that the industry has had its share of opportunists and inexperienced operators, such packers are now being weeded out by current economic pressure. Also, wartime lax quality control is being tightened and nationwide quality standards are even now being formulated. Refrigerated rail transport provides satisfactory if not ideal temperatures; reefer trucks can maintain zero degrees or lower, and low temperature warehousing practices are being improved. Manufacturers of retail cabinets, just released from wartime shortages and labor problems, are striving to produce the perfect type of case. Broadly, research in all branches of the industry promises rapid solution of remaining problems of quality, transportation and distribution.

It is reasonable to suspect that some consumer pressure has been felt by store managers for Safeway to stock and sell frozen foods—especially in metropolitan markets where per capita consumption of these commodities has increased. While the company resists stocking a commodity until consumer demand indicates a potential profitable sales volume, it would seem that, to satisfy all customers, Safeway will soon have to go into the frozen food business. If frozen foods could be distributed and retailed like other fresh and packaged foods, the company would probably be in the business today. However, a significant investment will be required for low temperature equipment before entry into this field, and Mr. Warren's bulletin indicates that this company will move with caution.

Airline Adds Henri

AIRLINE FOODS CORP.'S recent acquisition of Henri Foods, Inc., Long Island City manufacturers of spaghetti dinner and spaghetti sauces, gives the corporation its seventh food producing group. Through its various subsidiaries, Airline now manufactures, in addition to the Henri products: Old Judge coffee, tea and spices; Caruso spaghetti, macaroni and pure egg noodles; Airline prune juice and honey; Goodwin jellies and preserves; Chevy Chase tomato juice and apricot nectar, and Lippincott olives.

Press Association photo

HELICOPTER TO RESCUE

Californians claim it was an unseasonable rain that nearly ruined the cherry crop. An Army helicopter was pressed into service in an effort to save the $250,000 crop. Flying at treetop level, the 'kopter blasted the rain from the ripening fruit by the downdraft of the rotor blades.

DISTRIBUTION

No Increase Estimated In World Food Supply

DESPITE world-wide efforts to increase production, early crop conditions in important producing areas indicate the world food supply for the 1947-48 consumption year may be little, if any, larger than in 1946-47, according to the U. S. Department of Agriculture.

A survey by the department's Office of Foreign Agricultural Relations indicates that declines in grain production are indicated in several importing countries, but may be offset by increased production in the principal exporting regions.

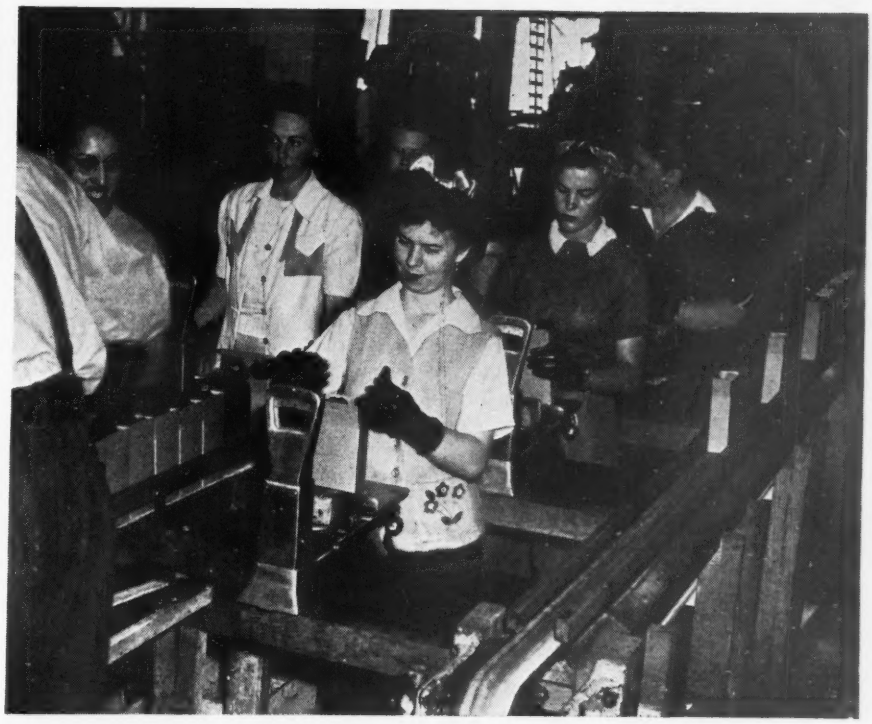
Such a shift in production will require a somewhat greater movement of grains in international trade during the coming year if supplies in importing countries are to be maintained at the relative low levels of 1946-47. Some increase is likely in the production of sugar, potatoes, and fats and oils but the supply of all of those commodities will continue below prewar. Rice crops in several of the major producing areas have not yet been planted but current indications are that production, particularly in the surplus areas of southeastern Asia, will continue below prewar and a continued shortage of rice is expected during the 1947-48 season. It is probable that exportable supplies of all of these basic foods during the coming year will be below important requirements.

The severe winter, extensive floods and labor shortages, have reduced the acreage in winter food grains in the countries of Western Europe below those of a year ago and only a small part of this loss can be made up by spring plantings. However, there will probably be larger acreages of sugarbeets, potatoes, and food grains, and a further recovery in output of livestock products is expected in 1947-48.

Glass Monopoly Case Reaches Settlement

SEVEN years of antitrust litigation between the government, the Hartford-Empire Co., Hartford, Conn., and several other glass container companies ended late in May with the entry of an order by Judge Kloeb, of the Federal District Court in Toledo, approving settlements with defendants found guilty of unlawful monopoly of glassmaking

For Assured Profits—Check-weigh for Uniformity of Package . . .



Checkweighing consumer cartons of dried prunes with EXACT WEIGHT Scales, Clara-Val Packing Co., Morgan Hill, Calif.

do it the Exact Weight Way . . .

A good food operation is the profitable combination of quality raw materials, good processing and sound packaging. The last operation is most important from a profit angle for a lost fraction ounce per carton, small and unimportant in one package, is a serious leak in volume production. Production men have long ago recognized the importance of production line checkweighing for uniformity in both hand weighing or checking packages from automatics. EXACT WEIGHT Scales have been preferred equipment wherever food is packaged and the bigger the volume the more importance is attached to the checkweighing operation. Write for full details for your business.

EXACT WEIGHT Scale Model #213 —Features (1) high speed operation due to extremely short platter fall, (⅛") (2) end tower construction which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x¼ oz. graduation—Capacity to 3 lbs.

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When A
"Better Mouse-Trap"
ISN'T ENOUGH
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METHYL BROMIDE

You can't catch a cockroach with a mouse-trap!

But when properly applied by qualified industrial fumigators—Westvaco Methyl Bromide kills *all* insect pests *and* rids your property of rodents!

So the most economical *and the 24-hour* way to end this double threat to products and profits is to fumigate with Methyl Bromide!

Consult Westvaco

Without obligation we will survey your plant, suggest structural changes where needed, advise on practises that prevent the incursion of pests; and recommend (and assist) the industrial fumigators who will supply Methyl Bromide and any other equally toxic "spot" fumigants that may be needed to render and maintain your plant infestation free!

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machinery and machinery patents.

Under the settlements with Hartford, the company will change its distribution system. For the first time in its history, it will sell outright its current lines of glass making machinery to container manufacturers, at the latter's request, instead of leasing the machines. This one change alone, the Justice Dept. estimates, will save the container manufacturers approximately $10,000,000 in royalty payments over the next five years.

Container manufacturers will now be able to make their own glass making machinery, or have it made for them by manufacturers of their own choice. This will enable both container manufacturers and independent machinery manufacturers to make and sell such machinery in competition with Hartford.

Glass making machinery manufacturers will benefit from a substantial reduction in royalty payments to Hartford. For example, the maximum rates for feeder machines are initially a third of the amount requested by Hartford, and are thereafter to be reduced. The settlement, while fixing maximum rates to be charged for patents, leaves in effect provisions of the final judgment authorizing further proceedings before the court if the royalties charged are excessive or if the patent position of Hartford deteriorates.

A further provision of the settlement requires the Hartford-Empire Company to dedicate to the public as of October 31, 1950, three of its basic patents covering glass feeders, which are essential machines in the manufacture of glass containers. Immediate cancellation of these patents, on the separate ground of fraud in their procurement, is being pressed for by the government in a suit pending in the Federal District Court of Wilmington, Delaware.

Separate settlement agreements also have been entered into with Hazel Atlas Glass Co., Ball Brothers Co., and Lynch Corp., under which glass making machine patents have been made available to the public at royalty rates designed to encourage their use. Owens-Illinois Glass Co., of Toledo, the largest glass container manufacturer in the United States, had agreed previously to license its glass making machine patents for the nominal single royalty of $1, and a similar settlement has now been made with Ball Brothers.

July Grain Exports

JULY export quotas of 1,407,000 long tons of wheat, flour (in wheat equivalent), corn, barley, and oats have been established by the U. S. Department of Agriculture. This is a total of approximately 54,500,000 bushels. Allocations for June (including emergency quotas) totaled 1,179,000 long tons.

The USDA will supply all grain and grain products for the U. S.-U. K. occupied zones in Germany and Italy, the U. S. occupied zone in the Pacific, and for Austria; and all wheat excepting quantities going to Mexico.

Harris & Ewing

PLAYING HOST

Despite the heavy load placed upon him as U. S. Secretary of Agriculture, Clinton P. Anderson managed to make the rounds at the recent meeting of the International Emergency Food Council in Washington. Here he is pictured with Mario Illanes, of Chile; Chen Chih-Ma, China; and Dr. Joaquin E. Meyer, Cuba.

Can Production Shows Processed Food Gains

EIGHTY-THREE percent of the steel plate used in can manufacture in 1946 went into production of cans for the food industry, according to George H. Kellogg, vice-president of American Can Co. Fruits and vegetables used 47 percent of all cans, while dairy products went into 12 percent, and other food products into 24 percent. This left 17 percent for all non-food cans, he said.

Mr. Kellogg pointed to the rapid growth, percentagewise, for frozen foods during the past 10 years and an even greater increase in volume of canned foods. The frozen foods gain, he said, were at the expense of fresh market produce. As an example, he noted that 59.2 percent of the green peas in 1936 were canned, 39.4 were sent to the fresh market, and 1.4 were frozen. In 1945, canned peas increased to 76 percent, frozen peas to 10 percent, while fresh peas dropped to 14 percent.

On a volume basis, canned peas increased by 23,000,000 cases, frozen peas by 4,800,000 cases, while fresh peas dropped by 3,600,000 cases during the 1936-45 period. Other food products, he said, showed a similar trend.

Warehouse Act Bars State Commissions

FEDERALLY licensed warehouses are exempt from state regulation of such matters as rates and operating and sales practices. The U. S. Supreme Court so held in ruling that the Illinois Commerce Commission was debarred from inquiring into matters regulated in any way by the U. S. Warehouse Act.

The case arose out of an effort by Daniel F. Rice, a grain shipper, to bring action before the Illinois Commerce Commission against the Santa Fe Elevator Corp., a grain warehouser. Rice accused Santa Fe of charging excessive and discriminatory rates, of illegally mixing its own and its customers grains, and of maintaining unsafe warehouses. He also charged violations of financial provisions of the Illinois public utilities law.

At the same time, Rice sought action by the Commission against the Chicago Board of Trade on the grounds that it had failed properly to regulate warehouses.

Santa Fe obtained a District Court injunction against any Commission action on the ground that the federal Warehouse Act de-

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OAKITE CLEANING

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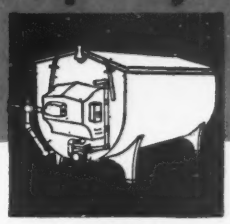
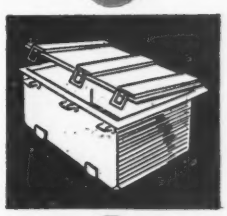
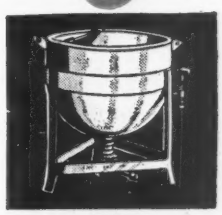


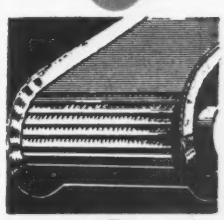
PASTEURIZERS



BELLY BOXES



KETTLES



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NO LAUNDERING *Just wipe off with a damp cloth. A tremendous cost saver.*

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WHITE—
4 Mill Plastic
27 x 36..$ 6.62 per doz.
30 x 36.. 7.58 per doz.
36 x 40.. 7.96 per doz.
36 x 44.. 8.85 per doz.
Full Length Sleeves
$6.00 per doz. pair

BLACK or WHITE
—8 Mill Plastic
27 x 36..$ 9.00 per doz.
30 x 36... 9.75 per doz.
36 x 40.. 11.15 per doz.
36 x 44.. 13.65 per doz.
Full Length Sleeves
$10.65 per doz. pair
Leggins, Hip Length
$13.10 per doz. pair

MAROON—Heavy Doubled Coated Neoprene
27 x 36..$12.50 per doz.
30 x 36.. 14.00 per doz.
36 x 40.. 18.35 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves
$12.90 per doz. pair
Leggings, Hip Length
$23.50 per doz. pair

BLACK—
12 Mill Plastic
27 x 36..$10.25 per doz.
30 x 36.. 11.15 per doz.
36 x 40.. 14.25 per doz.
36 x 44.. 15.80 per doz.

BLACK — Heavy Double Coated Neoprene
27 x 36..$12.90 per doz.
30 x 40.. 14.00 per doz.
36 x 40.. 18.33 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves
$12.90 per doz. pair
Leggins, Hip Length
$23.50 per doz. pair

BLACK or WHITE
—Extra Heavy 20 Mill Plastic
27 x 36..$14.20 per doz.
30 x 36.. 15.90 per doz.
30 x 40.. 20.15 per doz.
36 x 45.. 22.60 per doz.
Full Length Sleeves
$14.25 per doz. pair
Leggings, Hip Length
$25.75 per doz. pair

ALL PRICES F.O.B. CHICAGO
Minimum order 1 dozen.
ORDER BY MAIL OR PHONE TODAY
Free Sample Swatch on Request

All CLOTH APRONS Now Available
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Mr. George Dodge of Pratt's Fresh Frozen Foods, Inc., New York City, receiving the congratulations of Mr. J. J. Byrne, vice-president of the Manhattan Refrigerating Co., New York, on the first shipment of frozen foods at a maintained temperature below zero degrees from Omaha, Nebr., to New York City. This shipment was accomplished in the new BRDX 80,000 developed for the Burlington Railroad by the Dry Ice Equipment Corporation of San Francisco, Calif.

barred state regulation. Similarly, the Board of Trade obtained an injunction on the ground that the federal Commodity Exchange Act exempted it from federal regulation.

When the issues reached the high court, Rice and the Illinois Commission argued that federal regulation merely forbids conflicting state action, did not prevent additional regulation by the state.

The court, in a 7-2 decision, conceded that this is the general rule in interpreting federal legislation, indeed that this was the meaning of the original warehouse act of 1916. But it held that in amending the act in 1931, Congress intended to forbid any state regulation of features of licensed warehouses which the Secretary of Agriculture is empowered to control. Hence it sustained the injunction against state action on matters of rates and operating practices.

However, the court permitted the Illinois Commerce Commission to inquire into the alleged financial practices, since these are not covered by the federal act. It also permitted the Commission to proceed against the Board of Trade, because the Commodity Exchange Act does not explicitly forbid supplemental state regulation.

DEVELOPMENTS IN DISTRIBUTION

Long Range Plans Made At Meeting of Millers

LONG range production plans, education and research in milling technology, mill housekeeping and sanitation, transportation problems, and marketing studies received particular attention on the program for the May 5-7 meeting of the Millers National Federation.

Atherton Bean, vice-president of International Milling Co., Minneapolis, Minn. reported potential mill operation of 73 percent of capacity to produce 30,000,000,000 lb. of flour annually for domestic and export consumption during 1948-50 as compared with 18,458,500,000 lb. during the prewar low of 1933-34. Of this production, about 23,000,000,000 lb. or between 154-159 lb. per capita would be for domestic consumption as compared with 19,700,000,000 lb. or 154 lb. per capita during the middle 1930's, representing an average of 53.6 percent U.S.A. milling capacity. Growth of population is estimated to be at the rate of 1,350,000 to 1,500,000 per year to attain 146,000,000 people by 1950. During this period, the export market is expected to need an average of 7,000,000,000 lb. of

The Line that catches 'em

Sparkling Foster·Forbes glass-ware catches the eyes of food buying housewives.

FOSTER·FORBES

STANDARD FOOD BOTTLES

The line that never grows old

FOSTER·FORBES GLASS CO. • MARION, IND., U.S.A.

Sales Representatives: New York, St. Louis, Boston, Atlanta, Louisville, Detroit, Cleveland, Cincinnati, St. Paul, Memphis, Milwaukee, Kansas City, and Havana, Cuba.

flour as compared with 5,200,000,000 lb. exported in 1919, 4,900,000,000 lb. in 1945. Production capacity will permit an export of 8,000,000,000 lb. without interfering with a domestic consumption of 22,500,000,000 lb. in 1947 and between 22,500,000,000 and 23,200,000,000 lb. in 1950.

Dr. Betty Sullivan, director of research, Russell-Miller Milling Co. and chairman of the Federation's technical advisory committee, urged the adoption of a long range program for the training of mill operators and the study of milling problems. As recommended to the board of directors the program would provide for the establishment of a school of milling engineering at the University of Minnesota; for the expansion of the Kansas State College milling school; for the support of research projects at Kansas State College Milling Industry Department; for joint financing with American Association of Cereal Chemists of Biological Abstracts; for providing milling and grain authoritative speakers and lecturers to Kansas State College milling school students, and for the employment of a full-time entomologist. The program was approved in principle with details to be worked out by the Federation Executive Committee.

J. W. Holloway, manager of Kansas and Missouri River Mills, reported the need of 100,000 new box cars. Present supply is about 12,763 less than a year ago although the 1947 wheat crop is estimated to be 25 percent greater. Also retirement of old cars is exceeding the building of new ones. Southern flour mills have agreed to unload grain cars 24 hr. per day every day in the week to shorten turnover periods. A troublesome shortage is anticipated nevertheless.

New Soluble Casing Devised by Bureau

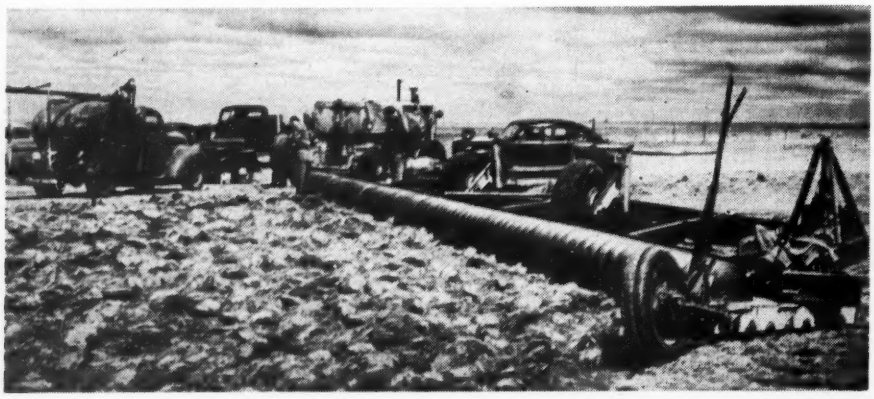
AN improved food-coating material has been developed by Western Regional Laboratory and announced by the chief of the bureau in a recent address to the advisory committee of The Nutrition Foundation.

The new material is made from citrus-peel or apple-pomace pectin. The coating properly prepared dissolves when the coated product is boiled or practically disappears if the sausage is fried or roasted. The material may be consumed with the meat, as it is a digestible tender material quite unobjectionable at the table. Dr. Howard describes the development as follows:

"The method for making this improved coating material is simple and easily controlled. A 2 percent dispersion of low-methoxyl pectin is prepared and adjusted to a suitable acidity. A salt of calcium is added in a quantity that will permit a solution of calcium pectinate to form at about 158 deg. F., but which will cause the material to gel when cooled to 104 deg. The sausage or other meat product, molded into any desired shape, is dipped in the solution for about three seconds, removed, and the gel coating dried in a current of warm air for half an hour to form a film coating of good strength. Treated products can then be stored in the usual way."

Frozen Food Packers Sidetrack Standards

FROZEN food packers showed little present interest in the standardization of package sizes during a recent meeting between frozen food representatives and the American Standards Association.



Associated Press

PLOWING FAR AND WIDE

This 60 ft. disc plow rips up a strip 42 ft. wide, plowing at the rate of 14 acres an hour. Invented by Monroe Terrell and T. W. Emerson, both of Texas, it is being used on a 3,600 acre wheat ranch near Cheyenne, Colo.

CASE HISTORY No. 16

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)

	350-lb. barrels	100-lb. burlap bags	50-lb. paper bags
Container cost	$7.90	$3.50	$1.60
Labor cost	1.33	1.00	.66
Total bag and labor cost	$9.23	$4.50	$2.26

Saving per ton
paper over barrels $6.97
paper over burlap bags . . $2.24

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CEMENT	FERTILIZER
CHEMICALS	FOOD
FEEDSTUFFS	MISCELLANEOUS ✓

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC
FLUFFY ✓	LIGHT ✓
FREE-FLOWING	VISCOUS

ST. REGIS PACKAGING SYSTEMS are designed to meet a wide range of product requirements and plant layouts. Packers are available in a variety of sizes and types, with filling speeds as high as twenty-four 100-lb. bags per minute—with one operator. Nearly 400 commodities—rock products, fertilizers, chemicals, foods, and feeds—are now being packaged in sturdy, low-cost multiwall paper bags.

How Multiwalls cut packaging costs 75%

and wiped out customer complaints

Customers said that burlap bags and barrels were bulky and that their workers complained about handling them. Container costs were high. The packaging operation — mostly manual — was slow, dusty, and inefficient.

This unhappy situation was causing plenty of headaches for the 67-year-old Southwark Manufacturing Company of Camden, N. J. This company packs several non-metallic minerals, including whiting, talc, and barytes.

"We were packing our whiting in 350-lb. wooden barrels and 100-lb. burlap bags," company officials said, "but there were many disadvantages. What we needed was a mechanical packing system and a cheaper, easier-to-handle container."

About 12 years ago this company adopted an automatic packaging system—consisting of three labor-saving 105-FV St. Regis bag-filling machines and 50-lb. multiwall paper valve bags. Here are the current savings:

- **Packaging costs (labor and container) dropped 75% compared to barrels—50% compared to burlap bags.**
- **Container costs showed an 80% saving over barrels —54% over burlap bags.**
- **Labor saving totaled 50% over barrels—34% over burlap bags.**

"Customer complaints just disappeared," these officials said. "They reported that the valve bags kept their whiting clean, dry, and free flowing and that their workers liked them because the 50-lb. size was an easy load for one man. Paper bags are cleaner, too, because there's no siftage. Another big point is that they take only one-third as much storage space as barrels.

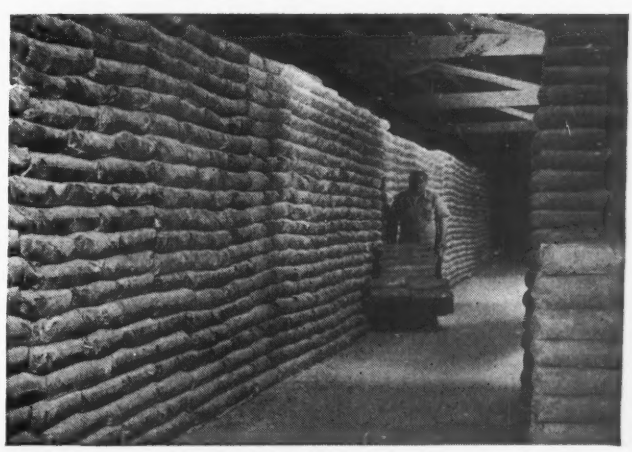
"They were so satisfactory from all angles that we switched to valve bags for our talc and barytes.

"We're sold on paper bags and so are our customers. If anyone comes to us, we'll be glad to tell him about the advantages of Multiwalls."

Mail the coupon for the detailed picture story of this operation. Learn how a St. Regis System like this can give you better packaging at less cost.

Multiwall self-closing valve bags are filled and weighed by these 105-FV packers. Only one operator is needed for each machine.

Below: A view of the storage room at Southwark Mfg. Company. Note how compactly Multiwalls stack — twenty bags high.



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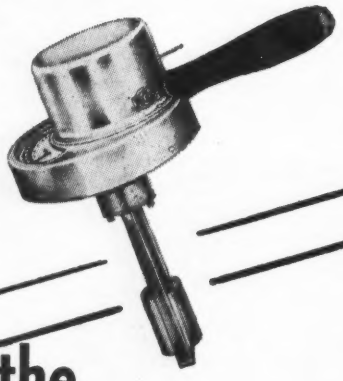

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The relative newness of the industry together with the varying demands of consumers and the difficulty of adjusting packages to different freezing methods were cited as reasons for the dim view taken of the project at the present time.

The one concrete proposal to come out of the meeting was a resolution to set up a sub-committee composed of important representatives of the industry to study standardization as it relates to frozen food packaging.

Resume Cheese Hearings After Recess in May

DISCUSSION of process cheeses required about two weeks at the F&DA hearings on proposed standards of identity. The May hearings were recessed until June 16 to give additional time for European manufacturers to reach this country and present information on foreign natural cheeses. French, Swiss, and possibly Italian representatives were expected.

During the May session on process cheeses some differences developed on the standards proposed last February. These included the holding periods, pasteurization requirements, package size and shape, and the coloring of cheeses, which are intended for further manufacturing.

Although the resumed hearings in June were primarily for manufacturers of foreign natural cheeses, additional testimony on any part of the proposed standards was permitted.

Onion Standards

COMMON green onions have been covered by U. S. Grade Standards since June 20, in accordance with an order published by Production and Marketing Administration on May 16 in the Federal Register. Provision is made for Grades 1 and 2, with tolerances indicated for size and defects. No provisions are included for degree of flavor or tear-producing qualities.

Standards for Berries

PRODUCTION AND MARKETING ADMINISTRATION has published new grade standards for berries for processing, effective June 2. This order makes effective the tentative proposal described in Food Industries, May, page 146. The order appeared in the Federal Register for May 6, beginning on page 3011.

Press Association

SUMMER PRETZEL

The Pretzel Bakers Institute is conducting a nationwide campaign to combat summer nervous tension by emphasizing the value of salt in the hot summer days. This 3x2 ft. pretzel illustrates what ingenuity can do.

Standards Amended For Canned Tomatoes

USE of additional calcium salts would be permitted with canned tomatoes, according to the tentative order amending the present standard. This tentative order, which appeared in the Federal Register on May 6, will probably be made final, inasmuch as no exceptions were filed prior to the date specified.

As the amended standard now reads, the following optional ingredients may be used: "Purified calcium chloride, calcium sulphate, calcium citrate, monocalcium phosphate, or any two or more of these calcium salts, in a quantity reasonably necessary to firm the tomatoes, but in no case such that the amount of the calcium contained in such salts is more than 0.026 percent of the weight of the finished canned tomatoes."

Ham Spoilage Reduced

USDA researchers have been able to reduce spoilage of hams during curing to the point where it is no longer a commercial problem.

If the meat is quick-chilled to 35 deg. F. immediately after slaughtering, and the initial curing temperature held below 38 deg. F., the growth of spoilage bacteria is inhibited until the curing mixture is able to hold the spoilage organisms in check.

Artery-pumping, another USDA research development, also cuts down spoilage by decreasing the curing time of hams.

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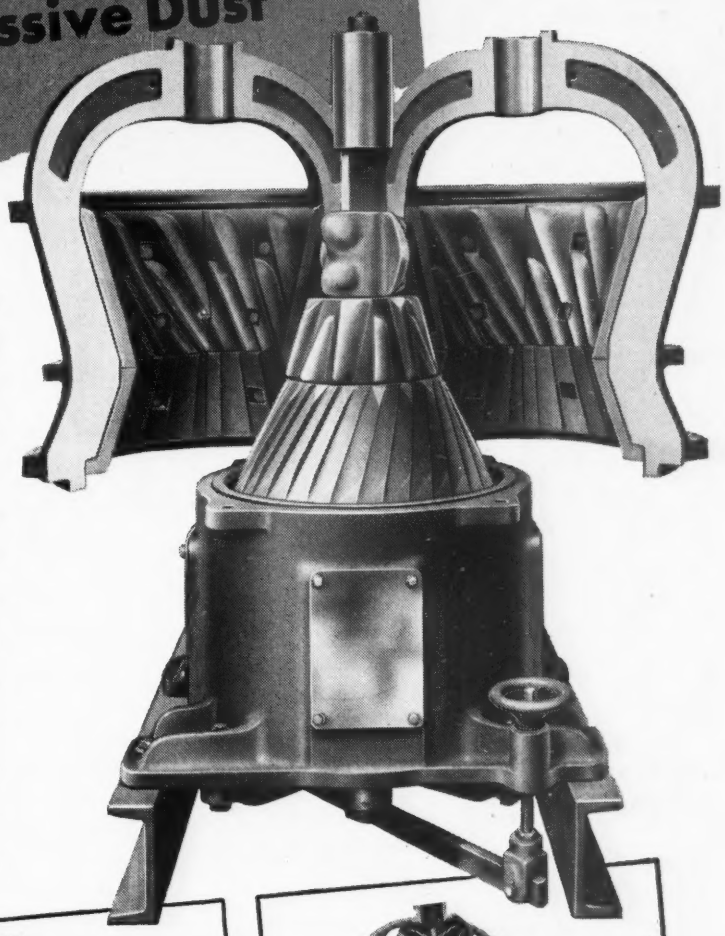

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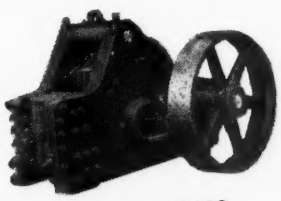

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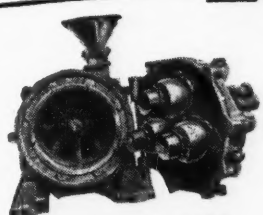

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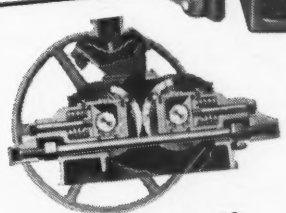

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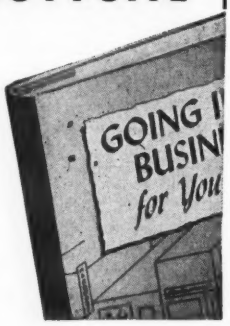

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RAW MATERIALS

USDA Asks Increase In Fall Pig Crop

The Department of Agriculture has recommended a 1947 fall pig production goal calling for farmers to keep 15 percent more sows than they kept to produce the 1946 fall crop now coming to market.

Achievement of this goal would result in a fall crop of nearly 35,000,000 pigs for market in 1948, compared with the 1946 fall crop of approximately 30,600,000 head. Since the 1947 spring pig crop is expected to be about 53 million head, the number indicated by the goal would result in a total 1947 pig crop of about 88,000,000 head. This would be nearly 5,000,000 pigs more than were produced in 1946.

Department officials stated that the increase in this year's fall pig crop is being sought to assure adequate meat supplies for 1948. The supply of beef and veal for 1948 may be less than the supply for this year. A decline in the rate of cattle and calf slaughter from this year's rate probably will be desirable from the standpoint of maintaining numbers at a level that will assure long-time national beef requirements. No difficulty regarding feed supplies appears likely if average corn yields are maintained, they said.

Soil Moisture Lowers Tomato Acid Content

Moisture content of the soil is one of the chief factors affecting the acidity of tomatoes, the greater the moisture content the lower the acidity, say scientists at the Experiment Station at Geneva. Soil moisture was also found to have the same effect on the total solids in the tomato.

The amount and kind of fertilizer used in growing the crop will also influence the acid content and total solids of ripe tomatoes as revealed in experiments carried on over a period of five years with 16 different varieties of tomatoes used by the canning industry in New York State. Nitrogen fertilizers applied with phosphorus and potash increased yields but had no appreciable effect on the acid content of ripe tomatoes, regardless of the source of the nitrogen.

Potash fertilizer, on the other hand, definitely increased the acid content and total solids of ripe tomatoes. "If one desires to keep the acid content of the tomato crop at a minimum," say the Station workers, "the field should be irrigated in dry seasons, and the addition of potash to the soil should be held to a minimum consistent with satisfactory crop yields. In catsup, tomato juice, and other products where a higher acid content is desired to give a more sprightly flavor, this may be accomplished by increasing the amount of potash used in the fertilizer."

In the Station tests, the acid content of all varieties was generally high at the beginning of the harvest period, declined as it progressed, and rose again at the end of the period. The acid content may vary as much as 25 per cent thruout the season. A summary of the findings in the five-year study appears in a technical publication now available upon request to the Experiment Station.

New Fertilizer Processes Reported From Germany

Two new methods of making synthetic fertilizers are described in a report on German nitrogen products now on sale by the Office of Technical Services, Department of Commerce. The report, prepared by Robert P. MacMullin for OTS' technical industrial intelligence division, describes fertilizer manufacture at the I. G. Farbenindustrie plants at Leuna and Piesteritz in the Russian occupation zone.

Leuna officials told the investigator that they had recently developed a process for making two of their

SOIL PLANTING

These seed pellet machines are designed to make arid lands green without irrigation through air sowing of seed pelleted with fertilizer. Dr. Lytle S. Adams, their inventor, is shown at left, working in his Tucson, Ariz., shop. He has already air-planted more than 10,000 acres for private owners in Texas.

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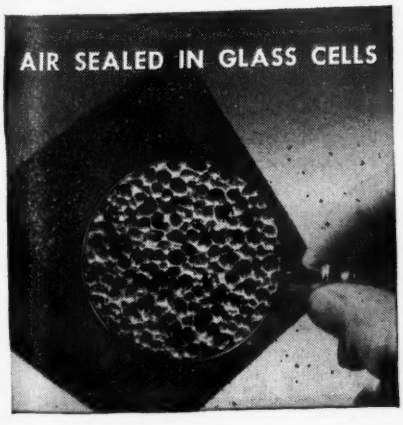

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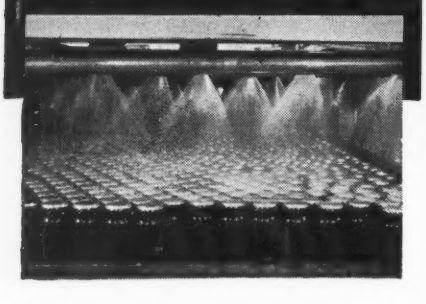

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standard fertilizers, Stickstoff-Kalk-Phosphat and Nitrophoska, without the use of phosphoric acid. Both products have been made at Piesteritz and Leuna for many years by adding phosphoric acid to the ground phosphate rock in order to raise the phosphate-calcium ratio to the point required for fertilizer. In the new process, raw phosphate rock is treated with nitric acid and the excess calcium is precipitated as calcium nitrate tetrahydrate, which can also be used as a fertilizer. After the phosphate material has been neutralized with ammonia gas it is granulated, either with slag to make Stickstoff-Kalk-Phosphat or with potassium salts to make Nitrophoska, and finally dried.

The process was never put into commercial production at Leuna because operations were curtailed by wartime shortage of phosphate rock. Leuna officials claim, however, that the new process has distinct advantages over the old.

Another fertilizer called Leuna Nitrophoska, somewhat different from the Nitrophoska obtained by the process described above, was recently developed at Leuna. Like the regular Nitrophoska, it contains 12 percent nitrogen, 12 percent phosphorus pentoxide and 21.5 percent potash. However, the phosphate is in a non-water soluble form, making it unusable for some purposes but perfectly suitable for certain other types of crops and applications. According to the German experts, Leuna Nitrophoska may be produced more economically than regular Nitrophoska. By decomposing the phosphate rock in stages, considerably less nitric acid is needed in manufacture.

Little Change Seen in Fats and Oils Supply

USDA officials will permit no change in export policy governing fats and oils until it is definite that total annual supplies are greater than estimated. Recent pressure to establish a more generous export program for lard and fatbacks got nowhere.

Government experts looking at the year's supply picture see no significant change. High prices and strong demand have caused the earlier crushing of oils seeds and the earlier marketing of hogs resulting in a sharp increase in visible supplies. A softening of the market followed. But actually there was no overall change in the number of hogs available for slaughter or the quantities of oils seeds for crushing this year.

REAL MILK BATH

Milk baths became a reality down in Georgia when the Eatonton Cooperative Creamery had to send skim milk down the drain, as the producers faced a glutted market due chiefly to the annual spring overproduction.

Two sources have produced more than earlier estimates. The copra industry of the Philippines has made a surprising come-back and is shipping at a higher than prewar level.

The stepped up copra imports have slightly eased the shortage of industrial fats. They also have permitted this country to export cocoanut oil for edible use in the place of margarine and other finished products in the original second quarter quotas.

Also there is now reaching the market about 10,000,000 lb. of peanut oil more than was anticipated, caused by the crushing of some stocks that would normally be consumed as nuts. This is the direct result of the price support program by which the oil mills are benefitting at the expense of the peanut butter manufacturers and candy makers.

These increased supplies are insignificant when compared to the total annual consumption of approximately 500,000,000 lb.

Sugars From Wood

FERMENTABLE sugars have been produced by the Scholler process in the Springfield, Oregon, plant, construction of which started about two years ago. The first carload of industrial (ethyl) alcohol left the plant about the first of June. This production was based primarily on the first of the five percolators to be started up. It was hoped that the plant would be in full operation by mid-June, with alcohol capacity 500,000 gal. per month.

USDA Cites Decline In Maple Sugar Output

PRODUCTION of maple products has declined steadily for about 30 years. The production of maple sirup in 1946 was about 4,000,000 gal., barely 5 per cent of the typical output 30 years earlier. Prices, however, have been very high in recent years, but have not sufficed, even at 70 cents a pound for maple sugar, to stimulate greater production.

Decline is caused, according to Department of Agriculture, by decrease in number of trees tapped and by uncertainty in available production as determined by weather. The department says:

"Maple sirup production is one of the most temperamental of farm enterprises. To get a good flow of sap at tapping time the weather has to be just right—well above freezing in the daytime and well below at night. Too much snow in the sugar bush makes it difficult to gather the sap. It takes from 30 to 45 gallons of sap to make a gallon of sirup. And further boiling of a gallon of sirup produces about 8 pounds of sugar. All this gathering and cooking process requires a good deal of labor. The sap runs from a few days to about a month and begins in March. Unusually early spring weather almost invariably means low production.

"With high labor costs, many farmers have had to give up their maple sirup operations in recent years. Many sugar bushes have been abandoned. Others have been sold for the lumber, a result of the strong demand at good prices for maple lumber, for flooring, mine props, and many other uses."

SCHEDULE OF EVENTS

July

20–23—Southern Wholesale Confectioners Association, annual convention, Hotel Roanoke, Roanoke, Va.
20–26—Fourth International Congress for Microbiology, Copenhagen, Denmark.

August

20–23—National Food Distributors Association, Chicago.

September

1– 4—American Society of Mechanical Engineers, fall meeting, Hotel Utah, Salt Lake City, Utah.
4– 5—Dairy Industry Conference, Cornell University, Ithaca, N. Y.
29–30—Oct. 1—National Coffee Association, annual convention, Yosemite National Park, California.

October

20–22—Bakers Supply House Assoc., annual convention, Edgewater Gulf Hotel, Edgewater Park, Miss.
21–25—Pacific Chemical Exposition, biennial meeting, Civic Auditorium, San Francisco, Calif.
27–29—International Association of Ice Cream Manufacturers, annual convention, St. Moritz Hotel, Miami Beach, Fla.

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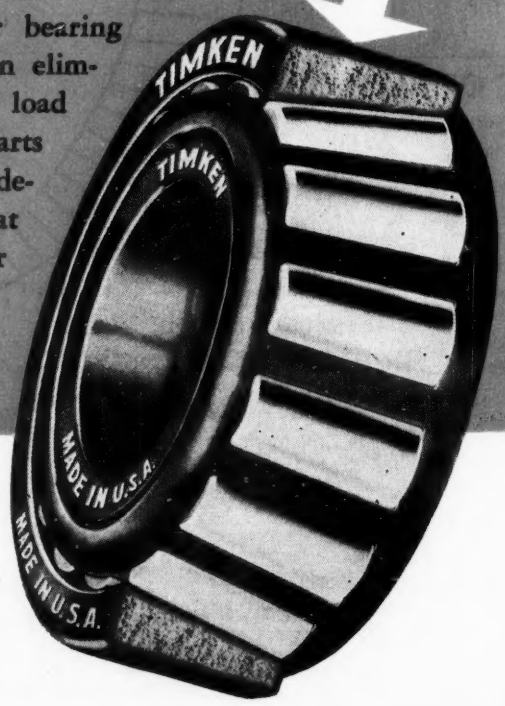

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TAPERED ROLLER BEARINGS

Changes in Food Supplies

(Indicators)

Production

Poultry canned or used in canning during March totaled 6,148,000 lb. This was 46 percent less than March, 1946, and the smallest March quantity in the five years of record keeping. Chicken represented 5,634,000 lb.

Ice cream produced during April is estimated at 54,695,000 gal., a 21 percent increase over March, but 16 percent less than the record April output last year. The increase over the five-year average has been declining steadily, from about 100 percent in January to 61 percent above in April.

Soybean oil production, both crude and refined, decreased slightly in April. Production of crude is reported at 141,000,000 lb., 3 percent less than March, but 12 percent more than April last year. Refined oil totaled 115,000,000 lb., 5 percent under March and 3 percent above April, 1946.

Canned pimientos packed in 1946 came to 598,000 cases on a 24/2's basis, according to the National Canners Association. No previous pack figures are available as this is the first time the Association has compiled the pimiento pack.

The canned sweet potato pack in 1946 came to 4,171,000 cases on a 24¾/2's basis, which compares with 3,074,000 in 1946.

Materials

Green lima bean acreage for canning and freezing will be about 15 percent above 1946 if all indicated plantings are made. The totals reported came to 84,460 acres, which would be 12 percent above the previous high in 1942. The California increase is indicated at 61 percent, while Michigan and Wisconsin are up 29 percent.

Cucumbers for pickles will use about 11 percent less acreage this year than last. About 118,600 acres are indicated for harvest, which compares with 134,220 acres harvested last year, and a ten-year average of 92,970 acres.

Pimiento plantings for packers indicate an increase of 39 percent above 1946. This would also be an increase of 36 percent above the ten-year average.

Tomato plantings are indicated at only 1 percent under 1946, according to reports from canners and manufacturers of tomato products.

Beet acreage this year is indicated at about 32 percent under 1946. Estimated at about 11,100 acres for harvest, the total compares with 15,760 acres harvested last year and a ten-year average of 14,180.

Stocks and Storage

Stocks of evaporated milk in the hands of wholesale grocers on March 31 were up 75 percent over the same date in 1946. Stocks of condensed milk were up 146 percent.

Frozen fruits in cold storage on May 1, totaled 319,000,000 lb. This compares with 291,000,000 lb. on May 1, 1946, and 367,000,000 lb. on April 1 of this year.

Frozen vegetable stocks on May 1, were estimated at 247,000,000 lb., which compares with 276,000,000 lb. a month earlier and 140,000,000 lb. on May 1, 1946.

Canned fruits, vegetables, juices and baby foods in packers and wholesalers' hands, at the end of the first quarter, totaled over 194,000,000 cases. This compares with less than 152,000,000 cases on hand on the same date last year.

Frozen fish and shellfish in storage on May 1, totaled 70,201,619 lb., compared with 75,318,433 lb. a year ago.

Indexes

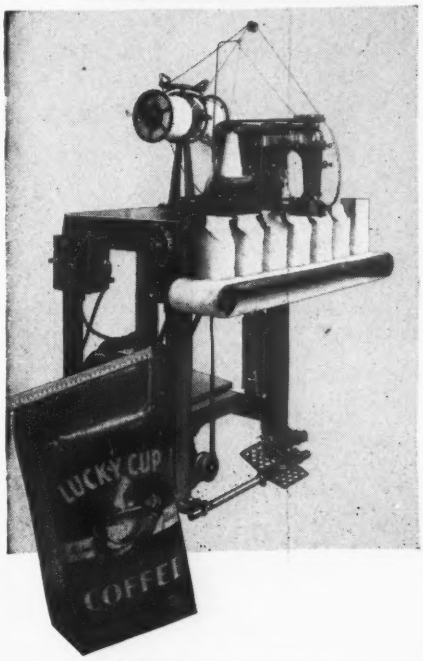
The commodity price index on food, compiled by the New York Journal of Commerce, was at 193.5 for the week ending June 7. This compares with 190.6 a week earlier, 192.8 for April, and 115.8 for June, 1946.

Business Week's index of business activity stood at 191.2 for the week ending May 31. It was 191.3 for the preceding week, 193.9 a month ago, and 15417 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Total Awarded — June (thousands)	Total Awarded — 1947 (thousands)
Bakery	$ 7,290	$...	$ 7,716
Beverages	4,755	417	2,935
Canning and Preserving	150	...	410
Cold Storage	370	...	2,122
Confectionery	55	...	514
Grain Mill Products.	1,656	...	19,481
Ice, Manufactured.	75	...	115
Meats and Meat Products	1,702	55	2,696
Milk Products	1,500	434	3,908
Miscellaneous	384	...	11,457
	$17,937	$906	$51,354

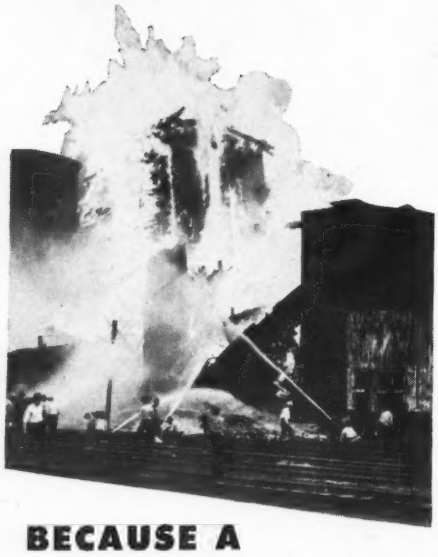
for closing
PAPER BAGS



Where food products are packaged in paper bags—from 1 lb. to 25 lb. size—the closure should be firm, tight, eye-appealing, inexpensive and easy to open. The ideal closure is the Union Special *"Dubl-Tape"* Closure. Producing this closure is the final step in mechanized packaging and can best be done with the Union Special 60000 D sewing head. Mounted on the popular Style 21800 N portable, table-type, bag closing machine, this is considered *essential equipment* by many producers of dry foods.

Style 21800 N machine includes a power-driven conveyor adjustable vertically to accommodate different sizes of bags. Control is by floor treadle and the unit may be operated from a sitting position. Ask for recommendations on your particular problems. Literature on request. UNION SPECIAL MACHINE CO., 437 N. Franklin St., Chicago, Ill.

Union Special
Bag Closing Machines



BECAUSE A FARMER LOST HIS *Pliers...*

• This story is short, tragic and typical. The farmer's lost pliers landed in a grain truck headed for the elevator. Dumped with grain into the mill elevator intake, the pliers struck a brace hard enough to spark and set off a dust explosion.

From the spark on, the story concerns only firemen and ambulances . . . Later, insurance adjustors — and planning the new mill. This time with magnetic separation protection.

Dings Magnetic Separators could have prevented this disaster by catching the tramp iron before it caused trouble. Separators not only prevent fires, they protect grinders, pulverizers and other machinery from damage by iron.

A nearby Dings Representative will be glad to discuss protection for your plant. Write for literature on the specific Dings equipment that will do the best job for you.

DINGS MAGNETIC SEPARATOR CO.
4741 W. McGeogh Avenue, Milwaukee 14, Wis.

Dings "HIGH INTENSITY"

"Magnetic Separation Headquarters Since 1899"

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

A BETTER PRODUCT—Most folks know that it is hard to make a good product from poor raw material. The Western Regional Research Laboratory of the Bureau of Chemistry has again proven this fact by its study of the juice made from Valencia oranges somewhat damaged by soft rot. Even in the absence of visible mold, such juice carries as much as 2,500 times greater population of microbe contamination than juice similarly made from sound fruit. The work also indicates that storage period for good juice is much longer with safety. This, of course, gives a dollar advantage offsetting part of the cost of closer inspection of raw material. The Bureau says, "The elimination of unsound fruit is obviously of prime importance in the production of frozen orange juice of low bacterial content."

FTC ALERT—There is evidence that the Federal Trade Commission is renewing its effort to prevent "unfair trade practices," especially in the industries serving the general public. Numerous "rules" conferences are being held to establish the limits of proper merchandising through adoption of enforceable trade practice rules. The divisions of the food business plagued by bad practice will get sympathetic hearing at FTC if they want aid. And sometimes aid may come unasked in the form of rules which will not be so welcome. This is true where FTC thinks that bad practices prevail.

SUPERIOR MEAL—Cottonseed meal made by solvent extraction contains very little residual pigment, gossypol. Recent feeding tests demonstrate convincingly, so the Department of Agriculture says, that this meal is much better for chicken feed. Meal containing gossypol reduces the growth of chicks and may definitely reduce the hatchability of eggs laid by hens eating such meal. Feeding tests conducted at Beltsville showed a substantial difference between cottonseed presscake meal and extraction meal. Furthermore, when some of the extracted gossypol was added to wholesome soybean meal, the same objectionable characteristics developed in chicks and eggs as have been previously noted from the use of unextracted cottonseed meal for feed.

NEW YEARBOOK—Five years' accumulation of research is summarized in the chapters of Yearbook of Agriculture 1943-1947 released in June by Uncle Sam. This volume is an exceptional composite of research findings which have been made available piece by piece during the war period. They are here put into perspective, permitting broader and more complete appraisal of important scientific trends not only for farm production of agricultural materials, but also their use in food industry. Many of the chapters deserve careful study by the food technologists.

AFRICAN PEANUTS—The British are developing new sources of fats and oils for the Empire. Recently noted in Washington is an extensive effort for peanut development in Africa. This is frankly admitted by the British as being a means for getting more food oils within British areas, in order to reduce unfavorable trade balances. Domestic fat and oil interests need not worry this year, probably not for several years; but the trend is clear.

FOOD IMPORTS—Better quality of imported food products is hoped for by Food and Drug Administration, as a result of the distribution in early June of a new document, "Import Requirements of the United States Food, Drug, and Cosmetic Act." This booklet, announced as Miscellaneous Publication No. 2 of F&DA, is intended primarily as a guide for foreign manufacturers and shippers, and as a manual for food importers. Actually it has a broader possibility. Food technologists interested only in domestic industry will undoubtedly find

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

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New Address .....

New Company Connection .....

New Title or Position .....

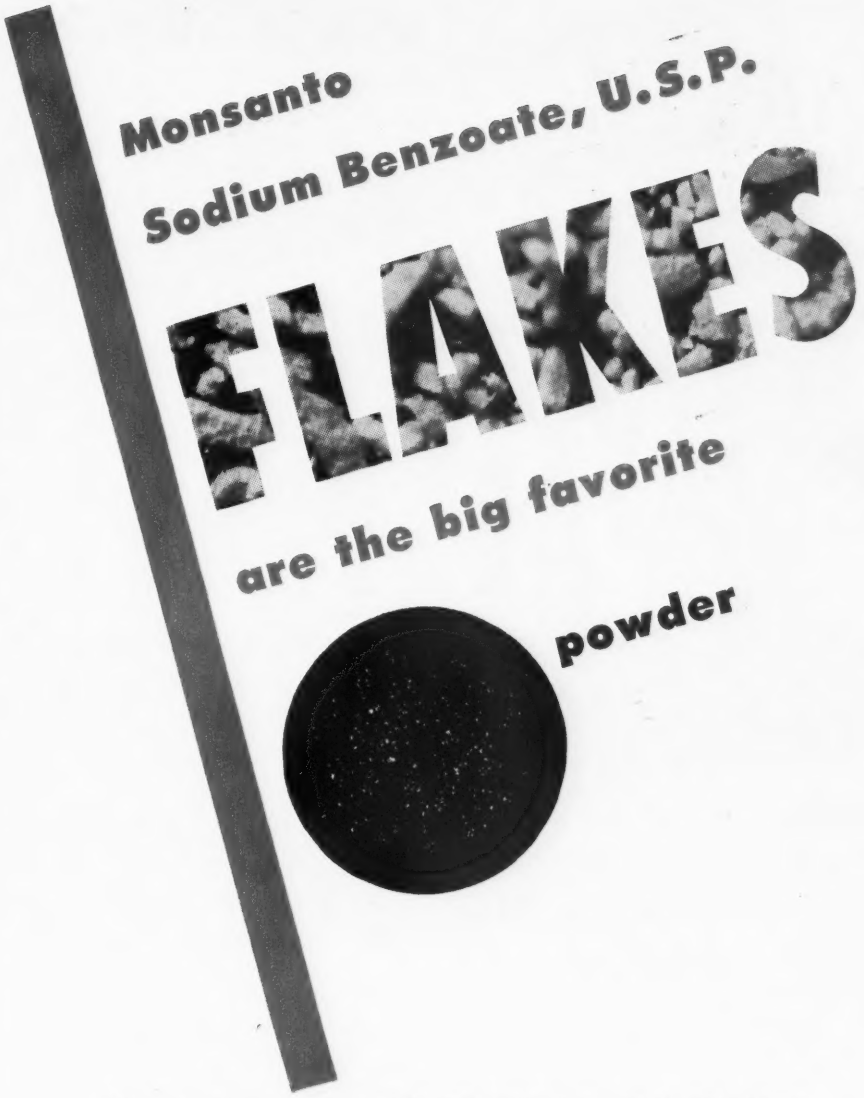
interesting suggestions and implications as to rules which they too must meet with goods made in the United States.

ONLY TWO MILLION—Analyzing the tremendous agricultural activity of the United States, the Bureau of Agricultural Economics describes American farming as "the largest private business in the world." But they also point out that of nearly six million independent farm establishments, less than a third market enough goods in total to be really entitled to consideration as commercial farms. The tremendous increase in cash income realized during the last five years, exceeding $20,000,000,000 per year lately, goes mainly to 2,000,000 farmers. Incidentally, they are the ones that get almost all of the real benefits of artificial prices maintained by price floors and bonuses of various kinds.

LOW-COST CORN—Corn processors, as well as corn users for stock finishing, may read with interest that corn production now costs two-thirds as much per bushel as it did in 1920 to 1928. This is the carefully studied conclusion of the Department of Agriculture, as it points out the advantages to the farmer in hybrid seed, adequate fertilizer, and effective mechanization. The department does not explain how corn users are going to get any benefit from this lower cost of production while the market price is more than two and one-half times as much as it was twenty years ago when higher costs prevailed.

TROUBLE AHEAD!—No recent action is more persuasive as to trouble to come than the recent effort of the Department of Agriculture to get housewives to cash their sugar stamps promptly. The trouble is not with sugar. It is with prospective boxcar shortage. Plant management in food factories should take the hint and promptly pile up better inventories of raw materials, where that is feasible, and should move out as near as possible to market the product that is ready. Later in the year the boxcar shortage may make both inbound and outbound freight movement more difficult.

WITH BOTH BARRELS—A double-barrel shot at pests can be effectively achieved by simultaneous use of DDT and Fermate. Department of Agriculture recommendation is that one pound of DDT with three pounds of Fermate be used in 100 gal. of water on tobacco seedbeds. The result is control of both flea beetles and blue-mold disease. Where other goods require attention from both fungicide and insecticide, such compatible combinations make for maximum economy. This is one of the few mixed pest-controllers thus far recommended. Others may well be sought.



Many food processors and bottlers who have tried both, favor Monsanto Sodium Benzoate, U.S.P., in flake form, rather than powder. Both are manufactured by Monsanto to the same high product-purity standards. There is, however, this difference:

Flakes, because of their physical form, flow more freely and evenly; do not lump or ball. They create less dust and are therefore less objectionable to operators. All this means better handling and blending.

Send for samples of both. Try both. See which is preferable for your use. Contact the nearest Monsanto District Sales Office, or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri . . .

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CHEMICALS AND PLASTICS

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CORN OIL LECITHIN

A boon to

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MARGARINE

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All processing using LECITHIN

Bone-Dry LECITHIN

Superiorities of the corn oil lecithin as stabilizer and anti-oxidant have been demonstrated in leading plants from introduction. NOW —exclusive factors of Vodol-XX have come to the fore, insuring new standards in quality production and preservation in the food industries. These are: 1) *Bone-Dry characteristic so positive as to prevent any moisture disturbance whatsoever in the processing.* 2) *Freedom from lecithin taste and odor under the most critical tests.*

USE COUPON BELOW FOR LIBERAL SAMPLE

See for yourself in your own plant tests, how Vodol-XX more nearly approaches the ultimate of dryness than lecithin science has ever heretofore accomplished. Repeated laboratory tests show new minimum in moisture content. Send coupon now!

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INDUSTRY

Bowman Dairy Co. has been awarded a certificate in recognition of services rendered by the company to Great Lakes Naval Training Station and Servicemen's Center during the war.

Bridgford Company, Los Angeles, has announced the appointment of M. E. Wangenheim as general manager in complete charge of all company operations. Mr. Wangenheim formerly was president of Hunt Foods, Inc., until his resignation last fall, and prior to that was president of California Conserving Co.

General Foods Corp., New York, has announced the appointment of Henry Sandberg as sales and advertising manager of the Post Cereals Division. He succeeds James North who resigned.

H. J. Heinz Co., Pittsburgh, has signed a contract with the AFL Canning and Pickle Workers for hourly wage increases ranging from 10 to 14 cents, covering 2,300 Heinz employees.

Hires Bottling Co. of Detroit is operating its new plant in that city. More than 25,000 square feet are being used for production and storage.

Imperial Sugar Co. has begun a $2,500,000 program of renovation and expansion at its sugar refinery at Sugar Land, Tex.

Interstate Cotton Oil Refining Co., Sherman, Tex., has changed its name to Mrs. Tucker's Foods Inc., to better identify the company and its products.

G. O. BAILEY

In charge of production for the Birds Eye-Snider Div. of General Foods Corp., for many years, G. O. Bailey has been named general manager of the division. He succeeds B. C. Olney, who has become a vice-president of the corporation.

Walter H. Johnson Candy Co., Chicago, is completing construction of a one-story headquarters plant.

Magnus, Mabee & Reynard has announced the appointment of Herbert F. Grafslund and John P. Grattan to the Mid-Western sales division with headquarters in Chicago.

Martin Food Products Co., Inc., Chicago, has announced the election of James J. Foy as president of the company. The company makes jams, jellies, preserves and peanut butter.

National Biscuit Co. has appointed Howard B. Tolley as production manager of the bread department. Mr. Tolley will be assisted by E. C. Palmer on bread production and J. J. Gallen on cake production.

North American Canning Co., Dania, Fla., has completed the remodeling of its plant which included a new automatic conveyor system throughout.

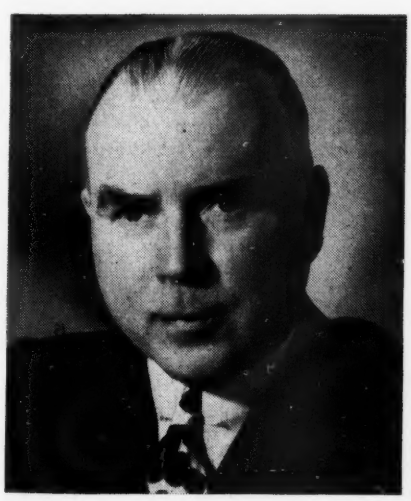
Philip Olender and Co., Detroit, has made known the appointment of John A. Glazer as head of the company's manufacturing division, which specializes in jams, jellies, powders, flavors for bakers and fountain sirups for the confectionery trade.

Pillsbury Mills, Inc., Minneapolis, has created a new grain division with Edmund P. Pillsbury as its vice-president. The division will operate as a separate unit in the purchase, sale and handling of all grains other than in the procurement of grain to be processed by other divisions.

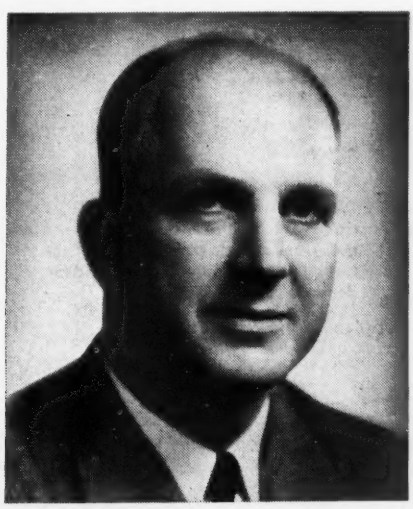
Royal Food Products, Inc., has been organized at Sturgeon Bay, Wis., for the manufacture of preserves and frozen fruits.

Stokely-Van Camp, Inc., Indianapolis, has been buying stock of the Capital City Products Co., Columbus, Ohio, manufacturer of shortening, dressing, oils and margarine. Stokely now owns approximately 17,000 of the 100,000 shares.

Sweets Company of America has elected its treasurer, Joseph T. Hand, to the board of directors. The company produces Tootsie Rolls, Tootsie Fudge Mix and other candies.



H. W. RODEN



VICTOR T. NORTON

WINSLOW J. ROEHL

Recent changes in personnel at American Home Foods, Inc., include some of the top executives. Victor T. Norton, former executive vice-president, succeeds H. W. Roden as president. Mr. Roden continues as a director of the company. Winslow J. Roehl, vice-president and director, has gone to Burry Biscuit Corp., Elizabeth, N. J., as vice-president and a director.

Whatever the Process

- FREEZING
- CANNING
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Use LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

Features that make La Porte Flexible Steel Conveyor Belting adaptable to all processing and packaging operations are: (1) its strong steel mesh construction that resists loading impacts and prevents stretching, weaving, creeping and jumping; (2) its porous structure that permits circulation of air and liquids around products in process . . . allowing drainage and facilitating cleaning and sterilization; (3) its non-corrosive metal that needs no special dressing and is not affected by steam or extreme temperatures.

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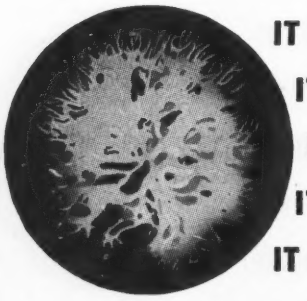

IT THICKENS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT SUSPENDS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

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SEAPLANT PRODUCTS DIVISION
NEW BEDFORD, MASS.

PERSONNEL

H. L. Callender has been elected treasurer of Corn Products Refining Co., New York.

W. N. Cumming, Jr., formerly manager of the San Jose, Calif., plant of Dry Pack Corp., is now with Baker-Cumming Packing Corp., fruit and vegetable processor in San Jose.

George Eastwood, president of Armour & Co., Chicago, since 1939, has been elected chairman of the board and chief executive. F. W. Specht, formerly vice-president and general sales manager, succeeds him as president.

Edwin T. Gibson, vice-president of the General Foods Corp., has been named executive vice-president. B. C. Olney and J. Nelson Williams have been advanced to rank of vice-president.

A. W. Gust, formerly chief chemist, Russell-Miller Milling Co., Dallas, Tex., is now chief chemist for the Colorado Mill and Elevator Co., Denver, Colo. Edward Joseph of the Russell-Miller Minneapolis plant is now chief chemist at the Dallas plant.

W. H. Hanson, formerly with the Henkel Flour Mills, Detroit, Mich., is chemist with F. W. Stock and Sons, Inc., Hillsdale, Mich.

Carl A. Herrick, manager in charge of the food manufacturing and warehouse departments of Post Cereals plant at Battle Creek, Mich., has retired after 44 years with the company.

John H. Kavanagh, sales manager of the West Roxbury, Mass., plant of Carr-Consolidated Biscuit Co., has been promoted to plant manager.

Dr. Chester L. Knowles, former technical director of General American Processes, New York, has announced the formation of Knowles Associates, chemical, metallurgical and mechanical engineers, New York. Associated with him are Otto R. Kuster and Robert C. Ried.

John H. Kraft, president of the Kraft Foods Co., has been elected chairman of the board of the company's Canadian affiliate, Kraft Foods, Ltd.

Leslie R. Mason, formerly chemical engineer with Food Machinery Corp., is now a chemical engineer with Quaker Maid Co., Terre Haute, Ind.

John A. Merten has been made president of the Columbia Brewing Co., St. Louis, Mo. J. S. McCourtney will be chairman of the board.

It's Easy TO CHANGE TO DARCOVA

THE ORIGINAL COMPOSITION CUP

MOST engineers and operators in charge of reciprocating pumps are aware that Darcova Pumcups offer distinct advantages over piston packing of other types—that Pumcups last 5, 10, or even 100 times as long, that fluid slippage is all but eliminated, that efficiency doesn't decrease with Pumcup wear, that pump speed can be reduced and volume increased, that power is saved, and that downtime and maintenance expense are cut to a fraction.

But what many of these men are not aware of is the downright simplicity of changing over to Darcova Pumcups. It's easier than replacing with the old type packing.

To simplify the change-over, to prolong liner and pump life, Darling Pistons are recommended. They are carried in stock at all times, can be supplied in various metals and alloys for every industrial need.

For a free bulletin containing complete information, write, or use the coupon below.

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Please send me the free bulletin checked below:
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WILLIAMSPORT, PA.

STOP COSTLY LEAKS!
SEAL PIPE JOINTS
with KEY-TITE
Pipe joints once sealed with Key-Tite do not leak, yet they can be easily opened because Key-Tite does not freeze the connection. It contains no lead nor lead substitutes and does not affect the taste or odor of potable liquids. Key-Tite prevents leaks on all lines carrying water, gas, low-pressure steam, compressed air, etc.
Send for Free Sample — test Key-Tite in your own plant at no cost to you.
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Rugged Solid Fibre and Corrugated Shipping Containers give effective protection to food products in transit and in storage.
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HUMMEL & DOWNING COMPANY
MILWAUKEE 1, WISCONSIN
WASTE PAPER IS A VITAL RAW MATERIAL . . . SAVE IT

Lewis J. Minor has joined the chemical staff of The Huron Milling Co., Harbor Beach, Mich., where he will work in product development, research and customer service.

Jules Novick, formerly director of research and quality control, Pan-Am Freezers, Inc., Brownsville, Tex., is technical director of Shoreland Freezers, Inc., Salisbury, Md., a newly formed organization for freezing fruits, vegetables and poultry.

H. C. Sheridan, former vice-president and general manager, Omaha Cold Storage Co., Omaha, Neb., has been elected president, succeeding P. C. Hyson, now chairman of the board. The company freezes eviscerated poultry.

Gen. Jonathan M. Wainwright, upon his retirement from the Army in late August, will become an officer of the Hom-Ond Food Stores, San Antonio, Tex.

John S. Ware, formerly vice-president of General Mills of Brazil and more recently with Welch Grape Juice Co., is now with National New York Packing and Shipping Co., freight consolidator and export shipper.

Fred Wise is the new chief chemist for Robinson Milling Co., Salina, Kan., succeeding H. L. Lentz, who has retired.

Martin Wise, formerly with Colorado Milling and Elevator Co., now is chief chemist, Western Milling Co., Pendleton, Ore.

DEATHS

Horace W. Armstrong, 65, president of Reid-Murdoch division of Consolidated Grocers' Corp., Chicago, May 7.

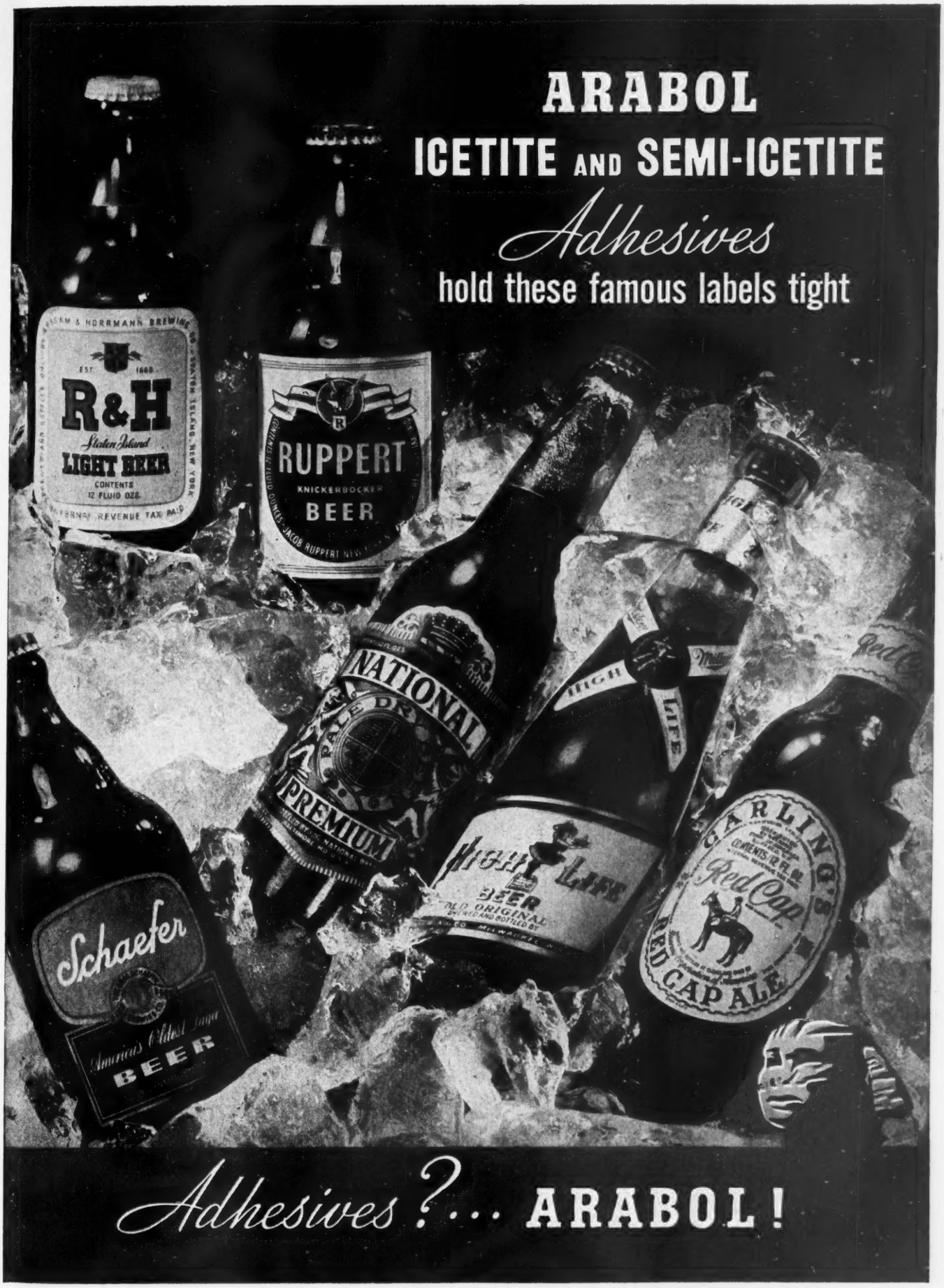
Murray Brierly, chemist, National Biscuit Co., Carthage, Mo., recently.

Charles F. Burns, 75, founder of the Alton Canning Co., Inc., Alton, N. Y., recently.

Harry S. Helm, 79, chairman of the board, Russell-Miller Milling Co., Minneapolis, May 7.

Ernst O. Heyl, 72, former manager of the pickle and condiment department of Libby, McNeill & Libby, later coordinator of purchases in the Food Administration in World War I and vice-president of Pet Milk Co., New Canaan, Conn., May 14.

John J. McDonald, 64, general manager of the McDonald Co-operative Dairy Co., Flint, Mich., and president of the Harvin Ice Cream Co., Lansing, Michigan, May 9, at Grand Blanc, Mich.



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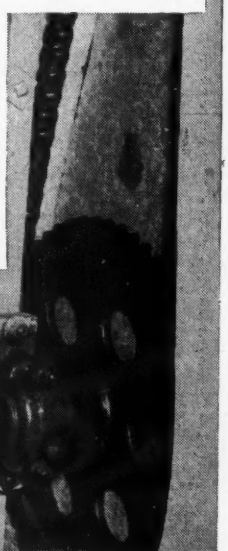
Order the right belt . . . from CYCLONE

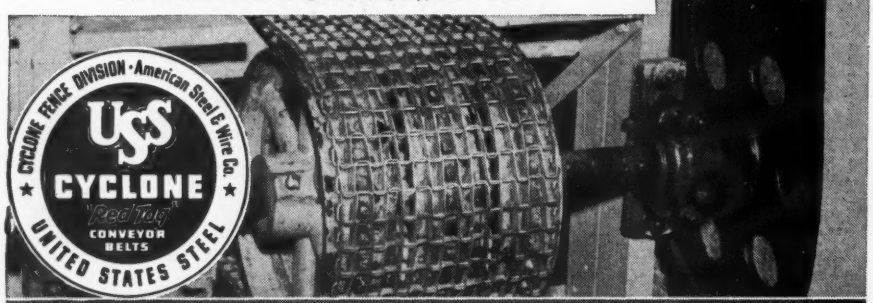
CYCLONE technicians will gladly analyze your conveyor belt problem and then recommend the U·S·S Metal Conveyor Belt that will do *your* particular job most efficiently. They are backed by more than 25 years' experience in making metal conveyor belts for industry, and they will specify the most suitable of our *three* types of belts. We make Flat Wire, Chain Link and Flex-Grid belts in a variety of metals, alloys and finishes. This wide selection assures you of the *right* belt for dependable, long-lasting, efficient service at your plant. Write for *free* catalog No. 3, or call our nearest office. Offices in principal cities . . . factories in the Mid-West and on the Pacific Coast.

Drive end of long, stainless steel Flat Wire Belt for processing tomato pickles and similar products.



By the makers of Cyclone Fence

CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-77, Waukegan, Illinois
United States Steel Export Company, New York



UNITED STATES STEEL

New

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ELECTRO-MAGNETIC
VALVE

THE *UNSURPASSED*
REFRIGERANT VALVE

For Freon Methyl Chloride
Sulphur Dioxide
also Air, Water, Gas, Light Oils, etc.

PROVIDES on and off control of liquid or suction lines. Used with standard thermostats for positive control of refrigerants in either defrosting or reverse cycle systems, multiple temperature processes or with by-pass or unloading valves. Bodies are die forged and all internal parts are bronze or stainless steel.

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Manufacturers of Automatic Pressure, Temperature & Flow Controls
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HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

25-3

Thomas A. McGough, 76, past president of the Southern Bakers Association, May 1, at Birmingham, Ala.

A. Obici, founder and president of Planters Nut and Chocolate Co., recently, at Wilkes Barre, Pa.

Michael A. O'Connor, 61, assistant general traffic manager of Wilson and Co., Chicago, April 25.

Charles J. Sutphen, 91, former president of C. J. Sutphen & Co., Chicago, and treasurer of National Pickle Packers Association for 23 years, April 23.

ASSOCIATED INDUSTRIES

Brunner Manufacturing Co., Utica, N. Y., announces that A. G. Zumbrun is chairman of the board of directors and managing director of the company, following the retirement of G. L. Brunner, Sr. G. L. Brunner, Jr., continues as president.

Dobeckmun Co., Cleveland, recently elected Ennis P. Whitley as vice-president in charge of sales for the company.

Fibreboard Products, Inc., San Francisco, has received approval of the Facilities Review Committee of the Office of the Housing Expediter to construct a sulphate pulp plant in Contra Costa County, Calif., at an estimated cost of $2,836,000.

Fritzsche Brothers, Inc., New York, has opened a branch office at Dallas, Tex., to answer the demand for essential oils and aromatic chemicals in the south central states.

Arthur D. Little, Inc., Cambridge, Mass., has made known the election of Leroy F. Marek as vice-president.

Mixers, Inc., has appointed Edwin E. Ritter to the position of designing engineer in charge of new development and production.

Monsanto Chemical Co., Springfield, Mass., has named F. A. Abbiati general manager of sales for the plastics division.

Owens-Illinois Glass Co. has purchased the plant formerly owned by Majestic Radio Corp. near St. Charles, Ill. The glass company will manufacture plastic caps for bottles there.

George L. Smutny, formerly assistant to A. M. March, general machinery division, Allis-Chalmers Mfg. Co., Milwaukee, has been appointed food industries representative for the general machinery division, succeeding Mr. March, who retired.

PROCESS INDUSTRIES REQUIRE COMPLICATED...

corrosion resisting STAINLESS STEEL *Agitators*

1½" hollow core runs full length of blade.

...and COOPER ALLOY has the casting "know-how" needed

The 7'6" Stainless Steel sigma blade illustrated weighed 1550 pounds and was cast for use in the basic manufacture of plastic. A 1½" hollow core runs its full length to enable constant cooling or heating of the blade by the flow of water or steam. Agitators cast of Stainless Steel are ideally suited for use in the process industries because of their corrosion resisting characteristics, ease of cleansing and high surface lustre.

Cooper Alloy has cast agitators of all sizes and types, from a few ounces to many tons. Consult our Engineering Department with your casting problems.

In addition to producing castings, Cooper manufactures a complete line of Stainless Steel Pipe Fittings, Accessories and Valves. Monthly Inventory Stock List now available upon request.

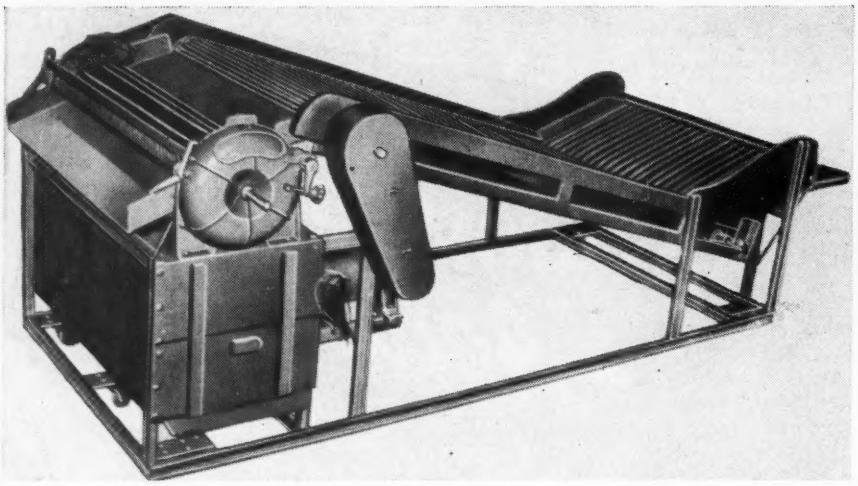
25 YEARS

THE COOPER ALLOY FOUNDRY CO.

HILLSIDE, NEW JERSEY

Specialists in Corrosion Resisting Stainless Steel . . . for a Quarter of a Century

FOOD EQUIPMENT NEWS



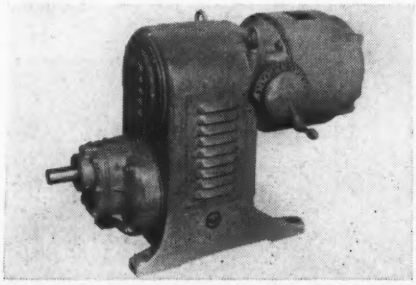
Rotary fruit sizer eliminates small plums, peaches, apricots, and nectarines.

Fruit Sizer 1

A ROTARY sizer which eliminates all fruit too small for packing is produced by Food Machinery Corp., Dept. I, Riverside, Calif. The new machine is designed to save much hand labor in grading plums, peaches, apricots and nectarines. Similar to one used extensively in citrus packing houses, the new sizer is a mobile unit that can be installed as an addition to existing equipment. It is said to do a thorough job without bruising the fruit. Fruit is first placed in the fruit dump hopper where it enters a steel roller elevator. Valleys on the extra long elevator line up the fruit so that it drops into the sizer unit without crowding or overloading. An adjustment on the 48-in. rotating pony sizer controls the size of the fruit selected. Undersize fruit drops between sizing rollers into a bin, while selected fruit passes on through to the next operation.

Varidrive Motor 2

A NEW series of variable speed drives, designated as Size 23, incorporating: Smaller size for given hp.; longer belt life; more convenient positioning of the speed adjusting handwheel, and provision for easier change of Varibelts, is announced by U. S. Electrical Motors, Inc., Dept. I, Milford, Conn. Assemblies are available to fit applications such as: Horizontal frame with shaft left or right, upright frame with shaft high or low, and built-in speed reducers of single or double reduction. Speed variations of 2:1 to 7:1 are obtainable with up to 5 hp. output.



All-in-one motor and variable speed unit.

Deodorant 3

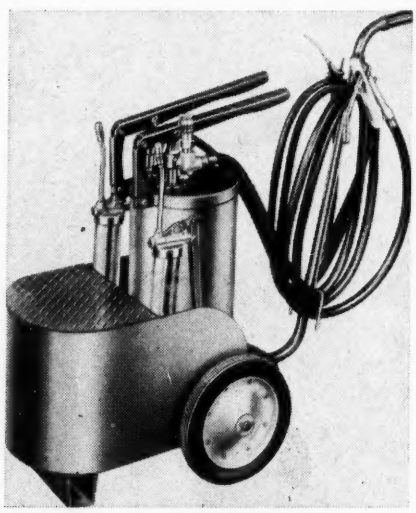
AN EFFECTIVE deodorant that has no odor is made by Ranetite Manufacturing Co., Dept. I, 1917 South Broadway, St. Louis 4, Mo. Due to the inclusion of potassium permanganate powder, Ranetite Odex as it is called is also a germicide. It is used in mopping floors, as a deodorizing flush for toilet room sanitation and many other general deodorizing uses.

A. C. Relay 4

AN ALTERNATING current relay has been developed by Automatic Signal Div., Dept. I, Eastern Industries, Inc., East Norwalk, Conn., to fill the need for a fast acting, reliable, compact relay for its vehicle-actuated traffic control systems. The relay stands up under duty as high as 10,000,000 operations per year. A circuit closure of as little as .010 sec. operates the relay cleanly and as many as 10 individual pairs of contacts can be accommodated on each relay. To meet the requirement of high insulation resistance, a method of individually encasing each contact spring in phenolic insulation was perfected. Coils for 115 v., 60 cycles and 12 v. 60 cycles, and pure silver contacts are standard. Other contacts and coils can be supplied on special order.

Lubricating Unit 5

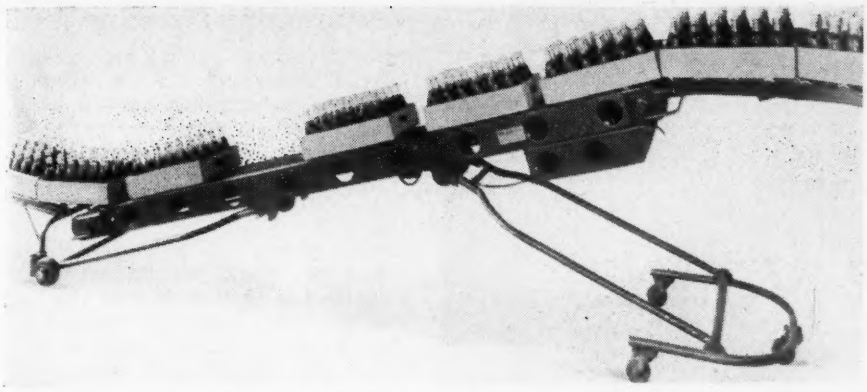
A NEW industrial lubricating unit for plant-wide use has been announced by the Industrial Division of Gray Co., Inc., Dept. I, Minneapolis 13, Minn. It is mounted on two semi-pneumatic tires and needs no air or electric connections. It carries a generous supply of three different lubricants—two greases and one oil. Two 1-lb lever guns and one ½ pt. pistol oiler are included. Pressure lube pump has built-in gun loader for hand guns. Lube and oil compartments are easily filled without removing pump. The front section incorporates a large tool box, with hinged lid, which also serves as a step for the operator to reach high bearings.



Portable industrial lubricating unit.

WRITE FOR MORE INFORMATION

Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.



Lightweight packaged material conveyor used as power booster with gravity conveyors.

Lightweight Conveyor 6

A NEW lightweight portable power conveyor for handling bags, boxes, crates, cartons, baskets and all kinds of packaged material has been announced by Material Movement Industries, Dept. I, 310 S. Michigan Ave., Chicago 4, Ill. It is called the Tote-All Packaged Material Zephyr. Made of special lightweight alloy steel, which is corrosion and abrasion resistant, the 10-ft. model weighs only 291 lb. complete with power unit and under-carriage. Power is furnished by an electric motor coupled direct to a gear reducer. Overall conveyor depth is 5½ in. Belt width 8 in. Rear wheels of under-carriage are solid—front wheels are swivel casters. Either end may be raised to 6 ft. height. Recommended carrying capacity—40 lb. to the foot.

Rubber Mat 7

A NEW design platform mat, particularly adapted to industrial use where workers must stand on their feet for long periods in damp and wet places, is announced by the B. F. Goodrich Co., Dept. I, Akron, O. It has a pebbled design on the back which pillows the mat ⅛ in. above the floor. Top design is corrugated or pyramid. Mats are made in black or brick red, in sizes ranging from 24 x 24 in. to 72 in. x 14 ft.

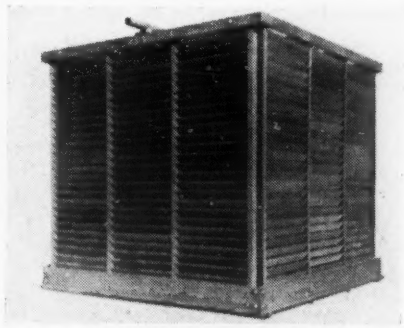
Automatic Palletizer 8

A MACHINE that automatically loads packages from a conveyor line onto empty pallets and cross-ties the packages to make a complete, compact pallet load ready to be picked up by a lift truck is manufactured by Production Aids, Inc., Dept. I, N. Hollywood, Calif.

Called the "Palletizer," the machine neatly stacks cartons on a pallet, disgorges the pallet and places another one in position. Speed is adjustable and cases of varying sizes and shapes can be handled. Cases are loaded onto a stripper plate in any desired pattern. When each tier is completed, the plate slides out from under the cases and they are placed on the waiting pallet. The pallet is then lowered the thickness of the case to await the next tier. The control mechanism is a series of relays which form a counting chain, each relay being a mechanical switch. The cycle for stacking cartons is predetermined by setting the controls prior to use.

Cooling Tower 9

A NEW spray type natural draft cooling tower for dairies, engine jacket and diesel engine cooling, refrigeration in ice plants and lockers and air conditioning, that can be purchased in various sizes, added to at any time and used for open or closed cooling system is offered by the Marley Co., Inc., Dept. I, Kansas City 15, Kan. Added features include: Capacity of 65 to 1,580 gal. water per min.; designed to withstand 100 m.p.h. wind with special earthquake design available; shipped knocked down with every member piece marked and complete erection, operation and maintenance instructions furnished.



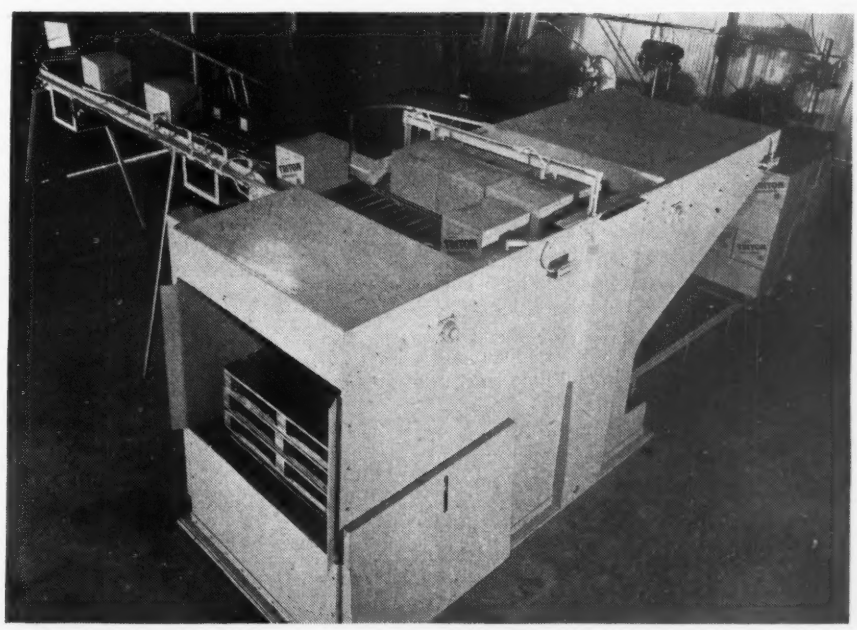
Prefabricated natural draft cooling tower.

Electronic Sealing 10

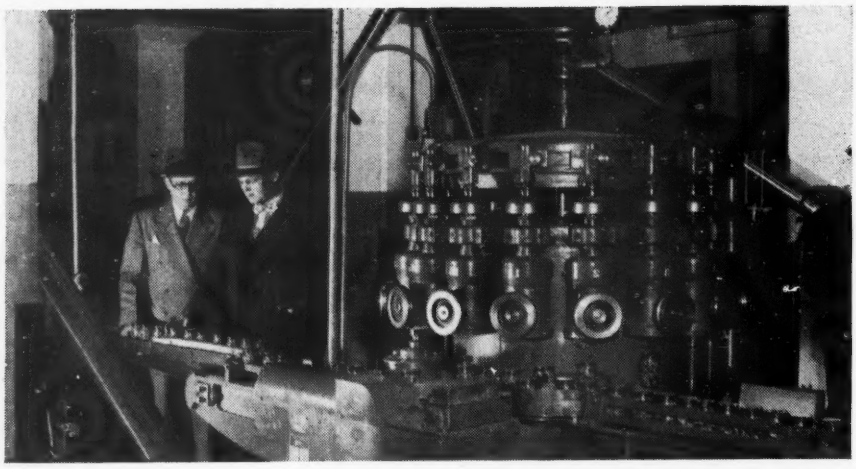
A NEW low-cost individual packaging protection for staple and frozen food products, meat products, candies, confections, powders and vegetables, dry or moist, is announced by the Precision Paper Tube Co., Dept. I, 2061 W. Charleston St., Chicago 47, Ill. Sheets of thermoplastic are slit to size and run through a special electronic sealer, forming a one-piece tube of the diameter and thickness specified. The tubing is supplied in any length (wound on spools if desired), from which it can be used in specific lengths for enclosure of articles, quickly cut, and end sealed. When a transparent material is used, the enclosure permits display and handling with complete protection of article. Foods are kept fresh.

Condensate Sentinel 11

CONSTANT insurance against contamination of return steam condensate is provided by an electrolytic conductivity method that operates warning signals, and even valves, to divert flow as desired. The method employs the Solu-Bridge Controller, made by Industrial Instruments, Inc., Dept. I, 17 Pollock Ave., Jersey City 5, N. J. This controller consists of: A compact, accurate Wheatstone bridge operating directly from the 115 v. 60-cycle a.c. line, with a cathode-ray "eye" tube as the balance indicator; and a self-contained, single-pole, double-throw relay, which reacts to the unbalance of the Wheatstone bridge



Machine stacks cartons on pallet, disgorges pallet and places another in position.



Machine vacuumizes and seals up to 150 jars per minute using thread metal caps.

and delivers line voltage up to 2 amp., for operation of warning signals or electrically-operated valves. The controller can be mounted at any convenient location, and connected to a conductivity cell which is mounted directly in the return line of the boiler. The relay terminals are wired to the solenoid, or motorized valves, located in the return lines at such points that, upon signal from the controller that contamination is present, the valves operate to divert the flow of condensate to waste. At the same time a bell or lamp may be operated to warn of the presence of contamination.

Gravity Conveyor 12

A NEW stainless steel gravity roller conveyor for use in damp or moisture-ridden locations is announced by Harry J. Ferguson Co., Dept. I, 145 West Ave., Jenkinton, Pa. Channels, rollers and roller ends are fabricated of 18-8 stainless steel. Bearing construction is of the "dairy type" providing lubrication-free installation. It is available in 10-ft. sections, 14-in. wide, with rollers located at 4 in. centers, weighing 123 lb.

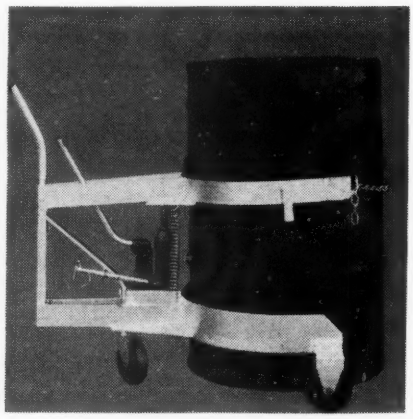
Label Coder 13

A NEW device that automatically places a clearly visible, yet inconspicuous, code-mark on wrap-around labels of glass jars and cans has been perfected by Adolph Gottscho, Inc., Dept. I, 1 Hudson St., New York 13, N. Y. The Jar-Coder, as it is called, is mounted in the rubber roll-off bed of a wrap-around labeler and, by electrical impulse, imprints a mark containing from 1 to 6, 3/32 in. characters horizontally on the label during the labeling operation. The imprint characters may be either letters, figures or symbols.

Marks appear in identical locations on all imprinted labels and, although permanent and readily identifiable by salesmen or production men, it is not conspicuous to the consumer, nor does it deface the label design. The device neither interrupts nor slows the speed of the labeling. It operates on 100 v., a.c. or d.c., and is installed with a minimum of alteration to the labeling machine.

Drum Truck 14

A NEW drum truck which makes use of a 1½ ton hydraulic automobile jack to raise filled steel drums off the floor is manufactured by Allied Welding & Manufacturing Co., Dept. I, 49 Lorna Doone Blvd., Orlando, Fla. Lift hooks, to fit a standard steel drum, make possible easy handling, transporting and stacking. By use of this truck, drums may be stored, two or more deep, under low shelves.



Truck lifts drums with hydraulic jack.

Vacuumizing Machine 15

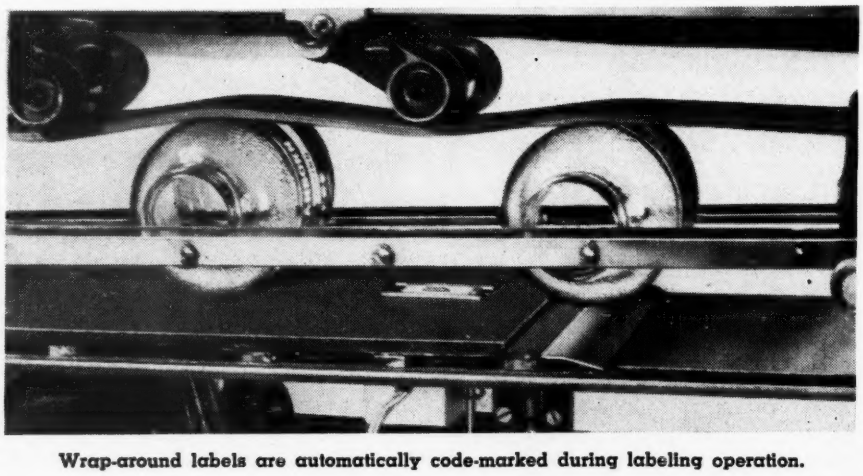
THE THATCHER GLASS MFG. CO., INC., Dept. I, Elmira, N. Y., has developed a speedy vacuumizing machine called Fastpak which handles up to 150 jars per min. smoothly and efficiently. It is adaptable to a wide variety of food products using continuous thread metal caps and can be set to process jars of different heights, from 4 to 7 in. It will evacuate to desired vacuum and seal as fast as the jars can be filled. Both delivery and discharge can be made through a range of 180 deg. The Fastpak machine operates on a 2 hp. motor and has antifriction type bearings and Alemite fittings. It is complete with mechanical brakes, worm gear drive and overload switch. Without filler pipe, the clear height is 72 in., the clear width 70 in., and the depth of the base 46 in. The feed line is 32 in. from the floor.

Fluorescent Conversion 16

SYLVANIA ELECTRIC PRODUCTS, INC., Dept. I, 500 Fifth Ave., New York, N. Y., is now marketing a conversion set which makes transforming bare fixtures into shielded fluorescent fixtures a simple operation. It allows for flexibility in appearance so the decorative scheme of any commercial space can be altered by substituting either glass paneling or louvered models without dismounting the original unshielded fixtures. The set consists of a shield frame assembly, glass panels or louvers, retaining clips, joint covers, and mounting hooks or brackets with necessary hardware.

Chain Hoist 17

A LINE of high speed, hand operated hoists that are nearly 45 percent lighter than standard hoists of comparable capacity are announced by the Chisholm-Moore Hoist Corp., Dept. I, Tonawanda, N. Y. Strength and durability have been increased while all excess bulk has been eliminated. Fewer parts, precision, antifriction bearings and sealed-in lubrication increase lifting speed, reduce operator fatigue and practically



Wrap-around labels are automatically code-marked during labeling operation.

Protected by Patapar Vegetable Parchment
Patapar Keymark
...simple way to remind your customers...
It's free—
When you use Patapar* Vegetable Parchment wrappers you are giving your product the best protection money can buy. So why not remind people of that fact. We've designed the Keymark for just that purpose. People everywhere have come to know the Keymark from Patapar advertisements in national magazines. And when they see it on your wrappers it reminds them the product inside is well protected. We'll gladly include the Keymark on your next order for printed Patapar. Just ask us. No extra cost.
As for printing — we do that right here in our own plants. We'll print your Patapar wrappers in one color or several colors — by letterpress or offset lithography.
*Reg. U. S. Pat. Off.
Patapar — the high wet-strength paper that resists grease, too

Paterson Parchment Paper Company • Bristol, Pennsylvania

Headquarters for Vegetable Parchment Since 1885

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BRANCH OFFICES: 120 BROADWAY, NEW YORK 5, N. Y. • 111 WEST WASHINGTON ST., CHICAGO 2, ILL.

WHAT IS A COLLOID MILL?

A colloid mill is a precision machine, capable of effecting in a confined clearance an intense shearing action on the particles and the particle structure of a processed mass, whether the particles be liquid, semi-solid or solid. This intense shearing action generated between the faces of a moving rotor and fixed stator reduces the particle size to the "colloidal range" of a few microns down to invisibility under the ordinary microscope and coincidental with this reduction in particle size, further produces a combination of forces within the mass which bring about the phenomena of dispersing, wetting, emulsifying and homogenizing.

The Premier Colloid Mill is a gravity-fed vertical mill that can be adjusted to any degree of clearance between rotor and stator. It may be run at high or low speeds.

What will it do in my plant?

It will emulsify and homogenize. It will disperse and disintegrate and grind. It will mix products evenly and uniformly. And, if the mill you use is a Premier, you can expect it to improve your product's quality, increasing its fineness and giving it stability. You can expect this while costs are being lowered and processing efficiency raised.

Where can I find out more?

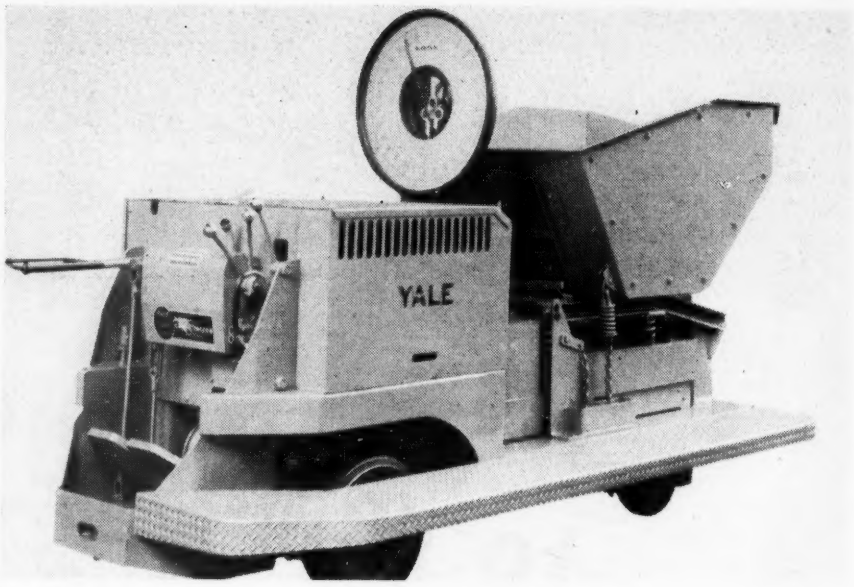
By asking for information from Premier Mill Corporation. The more you tell about your dispersion problems, the more complete and helpful the reply will be.

PREMIER CLIP COUPON FOR MORE DATA

COLLOID MILLS

PREMIER MILL CORP.
107 GENESEE ST., GENEVA, N. Y.
SEND DESCRIPTIVE CATALOG

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
FLUID_____

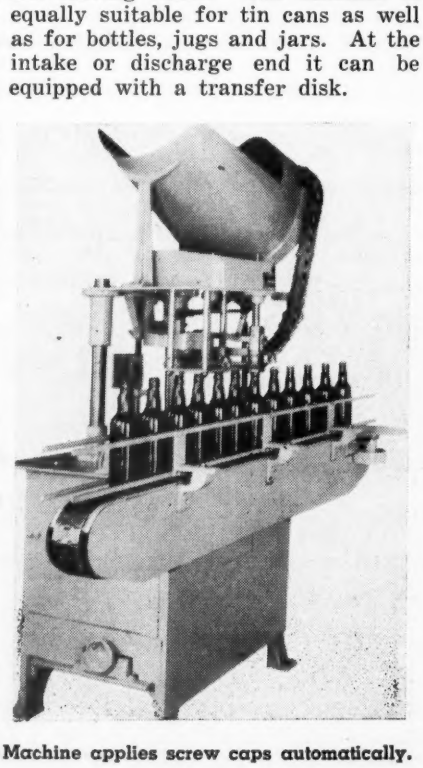


Mobile unit combines dump-bucket, platform scale and electric load-carrying truck.

eliminate servicing costs. Known as the Cyclone Model M, the new hoist is available in ¼, ½, 1 and 2 ton capacities. All models are equipped with "Herc-Alloy" steel chains.

Screw Capper 18

A SINGLE head, fully automatic straightway screw capper for bottles, cans and jars of all types and sizes, that will handle about 60 containers per min., is announced by Tite-Cap Machine Co. Inc., Dept. I, 1 Franklin Sq., New York 7, N. Y. Adjustable tension device controls tightening of caps. Bottle holders and timers, made for each size and shape of container, are easily and quickly changed over. Adjustable side rails guide the containers along the moving chain. The machine is equally suitable for tin cans as well as for bottles, jugs and jars. At the intake or discharge end it can be equipped with a transfer disk.



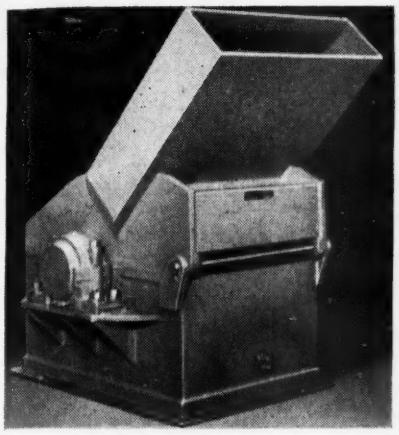
Machine applies screw caps automatically.

Scale-and-Dump Truck 19

YALE & TOWNE MFG. CO., Dept. I, Philadelphia, Pa., announces a new combination of three different handling tools in a single mobile unit for weighing out batches, transporting them about the plant, and dumping them. The unit embodies: A shock-absorbing dump-bucket; a platform scale; and a standard electric load-carrier truck. Called a "Portable Batching Scale-and-Dump Combination," it should find application in food processing, baking, canning and grain and feed industries. The 40-cu. ft. dump hopper is supported on the platform of the scale by means of 4 heavy coil springs which give the scale protection against the shock of dropping heavy loads into the bin and transporting over rough areas. The scale has a 24-in. diameter shatterproof glass protected dial which is graduated in 5-lb gradations and records loads weighing up to 300 lb. The truck itself embodies all the advantages of great power, simple control, speed, and maneuverability, which are incorporated in the general purpose electric load carrier.

Hammer Mill 20

A NEW, double-action hammer mill, especially designed to crush whole compressed caked material such as cotton seed, meat and fish scrap, soybean, chocolate and similar food has been announced by the Buffalo Hammer Mill Corp. Dept. I, 27 Washington St., Buffalo 3, N. Y. This mill is equipped with a chute-type feed which is set at an angle to the rotor. Whole cakes are fed into the battery of revolving hammers which first break the material off into small sections. These pieces are then pulverized against the breaker plate and are carried over the grate bars for final sizing. A built-in trap insures absolute protection against possible damage caused by metal or foreign



Cake and slab crusher has chute-type feed.

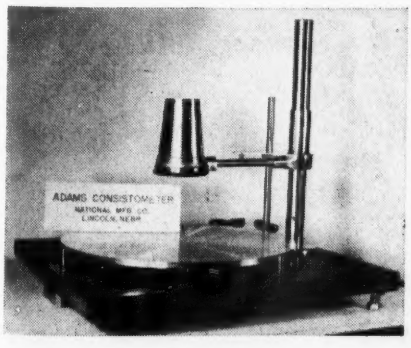
material. Grate bar spacing may be adjusted simply by adding or removing spacers for controlling fineness of grind. When a very fine finished product is required, the ground material can be screened externally and the tailings fed back into the mill.

Tablet Bottler 21

A NEW automatic tablet bottling machine, designed to handle a wide range of tablet and bottle sizes, has been developed by the U. S. Automatic Box Machinery Co., Inc., Dept. I, Roslindale, Mass. It will handle bottles from 1 to 2¼ in. in diameter and up to 5 in. high at speeds up to 120 per min. The operator loads empty bottles onto a segmented feeding table; from that point all operations are automatic. As the bottles reach the filling station, tablets are fed from the hopper on top of the machine down individual chutes equipped with specially designed segmented wheels that accurately, rapidly and safely count the proper number of tablets into each bottle. Counts can be set in all quantities from 12 to 300. Filled bottles are discharged onto a conveyor which transfers them to the next operation.

Consistometer 22

THE ADAMS consistometer, which was developed for grading cream style corn, yet has many other applications such as grading pancake batter, apple sauce and preserves, is now manufactured by the National Mfg. Co., Dept. I, 1218 N. 22nd St., Lincoln, Nebr.



Device for grading cream style corn.

for • SPRAYING
• WASHING
• RINSING
• COOLING
• AIR CONDITIONING

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for new Bulletin N-616.

YARWAY SPRAY NOZZLES

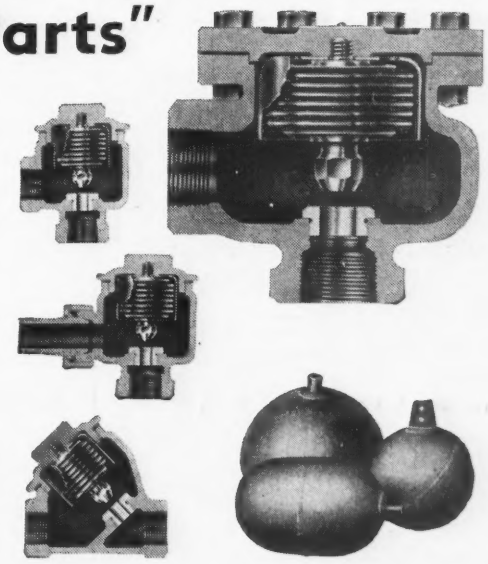
FAN-TYPE FOR FLAT SLICING SPRAY

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

More Maintenance Men Learning Answer to

"CUT YOUR INVENTORY of Spare Parts"

In maintenance departments the present universal "cut your inventory" order spells standardization. 4 reasons why an increasing percentage of plants are cutting spare parts stocks by standardizing on Nicholson steam traps: unequalled fast action; ease of repair; completeness of line; top-flight source of technical information on specification and maintenance problems.



5 TYPES for Every Purpose

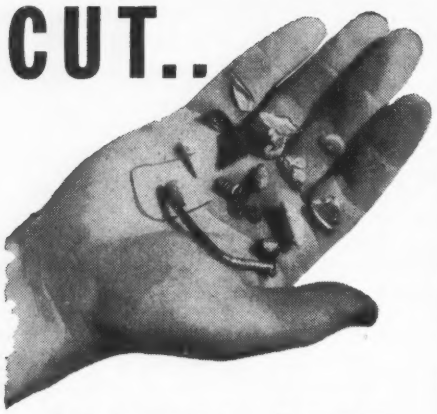
Sizes ¼" to 2"; pressures to 225 lbs. Low cost. Designed for severe service.

Trap Catalog 444

W. H. NICHOLSON & CO.
193 OREGON ST., WILKES-BARRE, PA.
Valves • Traps • Steam Specialties

Nicholson is one of America's largest makers of welded floats for operating mechanisms and as H. P. storage vessels. All sizes and shapes. Bulletin 746.

CUT..



STONING COST

3 WAYS

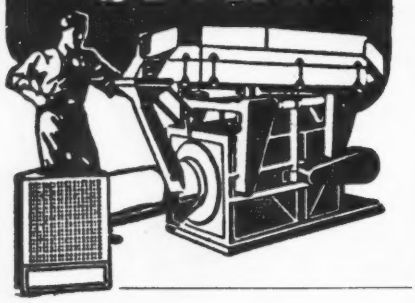
1 GREATER CAPACITY

2 HIGHER EFFICIENCY

3 LOWER POWER COST

No stoning bottleneck in YOUR plant when you install an AIR FLOAT STONER! Its high capacity — up to 16 tons per hour, — keeps processing in high gear! AND, no worry about contaminations in your finished product. The AIR FLOAT STONER removes stones, glass, NON-MAGNETIC as well as magnetic metals, and other hard, dangerous, contaminations with equal ease! AND, it does its work with an operating cost so low it is relatively insignificant. In fact, just ¾ of 1 H.P. per ton hour at full capacity! Write for bulletin FI-747.

SS&S AIR-FLOAT STONER



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DALLAS, TEXAS

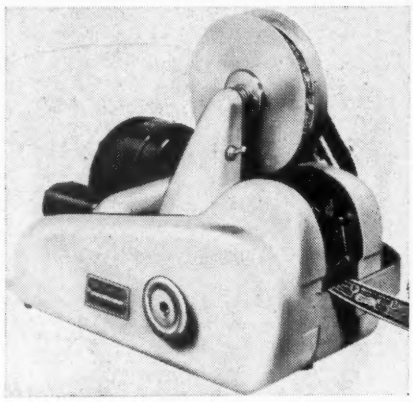
In Canada—Kipp Kelly, Ltd., 68 Higgins Ave., Winnipeg

Foreign—Separations Engineering, Ltd. 133 Bush House, Aldwych, London

To operate, a cone of 14-oz. capacity (see photo) is pushed down tightly upon an engraved disk and filled with the sample to be tested. The cone is then raised and the grade determined by the extent of flow of the product in a given time.

Label Dispenser 23

MILLER WRAPPING & SEALING MACHINE Co., Dept. I, 12 S. Clinton St., Chicago 6, Ill., has developed a new fully-automatic unit to simplify band labeling of small packages. The Corley band label dispenser automatically measures, moistens and cuts a new label from a roll of printed gummed tape as soon as one is removed. An additional advantage is that just

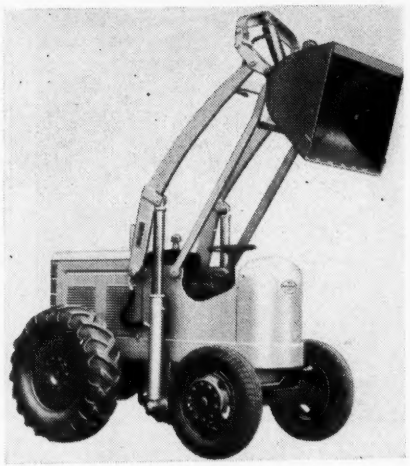


Fully automatic band label dispenser.

enough of the band is moistened to seal the overlapped ends together, plus an extra fraction of an inch to "spot-seal" the band to the package itself. It will take bands from ½ to 2 in. wide. Gear changes can be furnished to cut band lengths of 6½, 7, 7½, or 8 in.

Shovel Truck 24

THE FRANK G. HOUGH Co., Dept. I, Libertyville, Ill., has announced the Model HF Payloader, a ¾ yd. shovel, completely new in design, construction and performance. A 4-speed



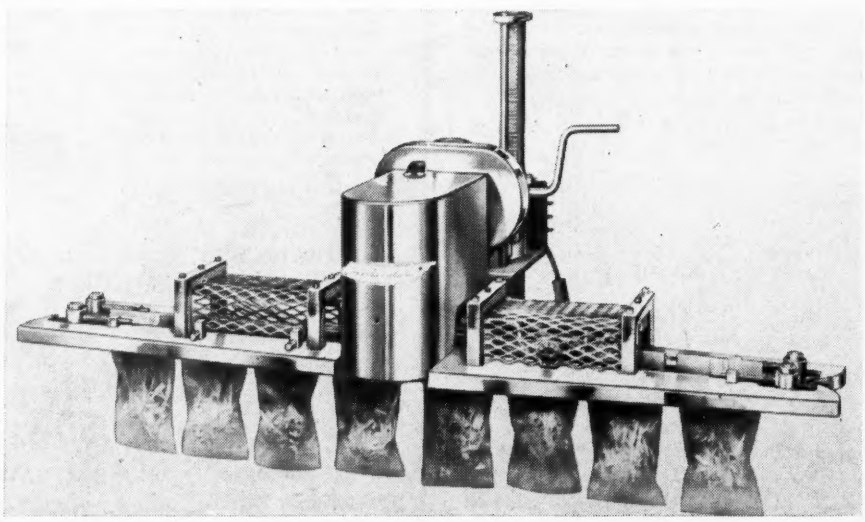
Shovel truck with ¾ yard capacity.

fully reversible transmission provides practical forward digging speeds plus high reverse maneuvering speeds. A single lever shifts gears into the desired speed range. The bucket is raised, lowered, dumped and relatched by hydraulic power, controlled by a single lever. Bucket may be dumped completely or gradually at any height.

Full bucket capacity is assured and spilling of loose materials prevented by means of the automatic bucket tipback. Large easy rolling wheels, equipped with hydraulic brakes, simple automotive type steering and complete visibility in all directions are additional features.

Bag Sealer 25

A NEW rotary "Speedsealer" that will seal bags at the rate of approximately 400 linear in. per min., conveying the bags through preheater, sealing rollers and cooler (if bags require cooling and pressure after sealing) is announced by Pack-Rite Machines, Dept. I, 714 W. Wisconsin Ave., Milwaukee 1, Wis. Spring-loaded float arms on both preheater and cooler attachments insure correct tension on high speed silent chains as they travel the entire length of the



Rotary heat sealer has fool-proof chain take-up, preheater and cooler attachment.

For the Protection of Frozen Fruit Against Browning

Ascorbic-Citric Acid Mixtures

No. 4-96 and No. 8-92

● These double-purpose mixtures have been developed as the result of an extensive research program designed to reduce the cost of this protection.

The ascorbic acid component furnishes the actual protection while the citric acid inhibits the action of the enzymes naturally present in the fruit. It is these enzymes which normally speed up the destruction of the ascorbic acid by atmospheric oxygen, following which browning and flavor deterioration take place. With their activity reduced by the citric acid, there is a corresponding reduction in the amount of the comparatively expensive ascorbic acid required for protection.

The No. 4-96 mixture is designed for fruit low in acidity or which is to be packed in heavy syrup.

For fruit of higher acidity or which is packed in syrup of lower concentration, the No. 8-92 mixture should be used.

For further information please inquire of Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Avenue, Chicago 10, Illinois; 605 Third Street, San Francisco 7, Calif.

PFIZER

PFIZER QUALITY

Manufacturing Chemists Since 1849

5172

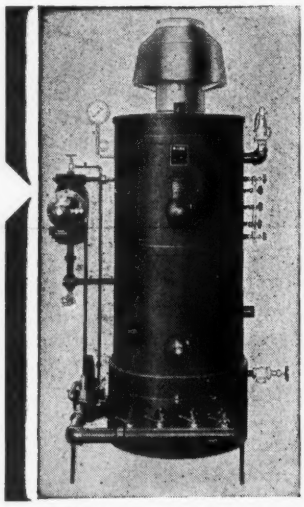
the KANE

AUTOMATIC GAS-FIRED

STEAM BOILER

- - - - - - - A RELIABLE, TROUBLE-FREE SOURCE OF CLEAN STEAM . . .

Compact, self-contained, and tailor-made" for your job . . . that includes: the study and solution of your problem; the correctly sized and constructed KANE Automatic, Gas-Fired Boiler; the M-K-O Automatic Boiler-Feed to provide a constant water level for highest boiler efficiency.



The KANE Boiler is built, in sizes 1 to 30 HP., to A.S.M.E. specifications for operating pressures up to 100 lbs. Special boilers for higher pressures built to order.

Although current demands cannot be supplied immediately, we'll try to fill your urgent needs as soon as we can.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE.

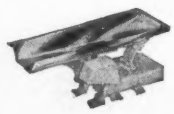
SYNTRON

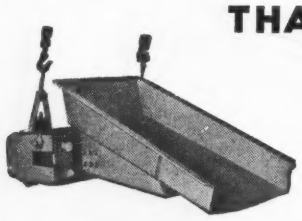
"Vibra-Flow"

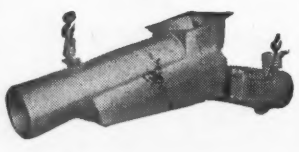
VIBRATORY FEEDERS

Have 5 Distinct Features—

1. Handle a range of materials from light, fine powders to heavy, coarse ores.
2. Provide rheostat control of material flow.
3. Have no moving, wearing mechanical parts.
4. Available in a variety of trough styles, flat pan, tubular, grizzly, spreader, etc.
5. Capacities of from a few pounds to 500 tons per hour.







THAT WILL INCREASE YOUR MATERIAL HANDLING EFFICIENCY

An illustrated folder is available, or—if you'll send us the details of your problem—description of material to be fed, maximum feed per hour, desired length of trough, etc.—our Engineering Department will be glad to submit their recommendations.

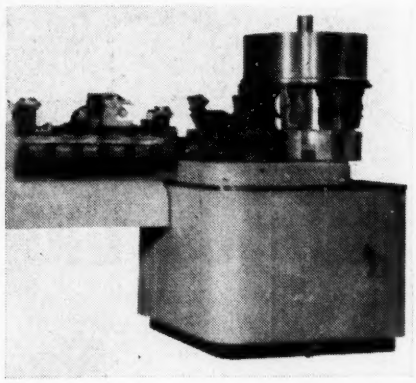
SYNTRON CO.

460 Lexington Homer City, Pa.

machine. Entire running track is hard chrome plated so that the hardened steel chains will not cut into the track. Obtainable with or without cooler attachment, depending on the type of bags to be sealed. Length of unit is 4 ft., weight 150 lb.

Envelope Filler 26

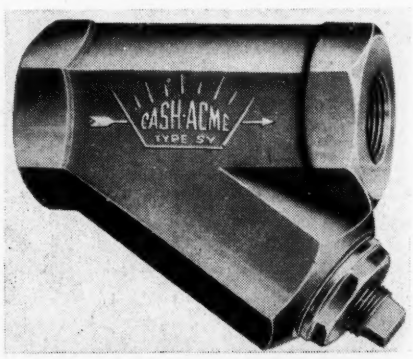
A NEW high-speed envelope filler that fills and seals envelopes of 1 to 3 oz. capacity with any powdered or free-flowing material at the rate of 200 per min. is made by Carter Engineering Co., Dept. I, Danville, Ill. Envelopes are fed automatically from twin magazines to a rotating dial where they are opened and filled while rotating. They are then transferred to a conveyor for gluing and sealing, discharged from this conveyor at two points alternately, stacked and counted in any desired number. One operator keeps the magazines filled with empty envelopes. Four operators are required to take the filled envelopes from the discharge chutes. Where desired, the machine may discharge to a conveyor belt.



Machine fills and seals 200 bags per min.

"Y" Strainer 27

A NEW "Y" type strainer available in pipe sizes from ⅛ to 2 in. is announced by the A. W. Cash Valve Mfg. Corp., Dept. I, Decatur 60, Ill. They are available in either cadmium plated rust-resisting cast iron or all bronze construction, and are built around 250-lb standards for cast iron and suitable for 400-lb. service when furnished with bronze bodies.



"Y" type strainer for ⅛ to 2 in. pipe.

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Process Equipment 51

John Nooter Boiler Works Co.—16-page booklet, illustrating and describing the various types of fabricated process equipment made by this company. Contains a 4-page section in which corrosion data are tabulated.

Valve Reference Chart.....52

A new 20-page valve cross reference chart containing a complete listing of OIC valve numbers in order, with their description, has just been released by The Ohio Injector Co.

Dust Collectors 53

Peters-Dalton, Inc.—Bulletin 101, entitled "Hydro Whirl Dust Collector," illustrates and describes the industrial dust collecting equipment made by this company. Principles of operation are described and illustrated with sketches and the various types of equipment are depicted both in photographs and drawings. Method of planning and laying out a dust collecting system is described and illustrated. Contains a table of air velocities for conveying various types of dust material. Bulletin 201 features this company's wet type spray booth.

Remote Control System 54

Yardney Engineering Co. — 4-page bulletin on "Flectrol" an accurate, flexible electrical remote control system adaptable to speed changing equipment and motor-operated valves. Contains illustrations and descriptions of the control and its application.

Valves 55

Manning, Maxwell & Moore, Inc.—12-page bulletin, 8500-B, illustrating and describing the Hancock boiler valves made by this company. Construction details are shown in cutaway views and dimensions of the various valves are tabulated. Price lists and discounts are included.

Rotary Pumps 56

Blackmer Pump Co.—40-page catalog 106 on rotary pumps. Contains illustrations, descriptions and specifications of the complete line of Blackmer pumps, including power pumps—with and without motors, marine, sanitary, truck and hand pumps. Also "Ezy-Kleen" strainers, and 6 pages of capacity and horsepower tables.

Cooling Equipment 57

Santa Fe Tank & Tower Co.—Bulletin CE-47 contains information on the cooling equipment made by this company. Includes information on cooling towers, fin units, spray ponds and nozzles.

Continuous Packaging 58

Battle Creek Bread Wrapping Machine Co.—Catalog containing full information on a complete new line of wrapping and packaging equipment with speeds ranging from 30 to 120 packages per min. Automatic operation is stressed throughout. It graphically describes the operation of the machines through the use of flow charts which itemize each packaging operation from start to finish.

Steam Traps.....59

W. S. Rockwell Co.—Bulletin No. 28 describing a steam trap recently introduced that is said to offer particular advantages in automatically draining water or water and oil from compressed air, saturated steam, superheated steam, unit heaters, steam-jacketed tanks and kettles and other equipment.

Multi-Stage Pumps 60

Economy Pumps, Inc. — Catalog B-1146, covering CS vertically split case multi-stage pumps, built for capacities ranging from 50 to 220 g.p.m.

Locker Plants 61

Lockers, Inc.—Illustrated equipment catalog of frozen locker plants containing valuable technical data and helpful applications.

Floats 62

W. H. Nicholson & Co.—Bulletin 746. Contains 8 pages describing the welded floats made of stainless steel, monel or chromium plated steel. The spherical, elliptical and cylindrical shaped floats are available in sizes from 2 to 14 in. in diameter for use in various applications such as dairies and canneries.

Bronze and Stainless Pumps.....63

"Valley Bronze and Stainless Steel Pumps for Food Processing" is the title of a new 8-page brochure issued by Valley Foundry & Machine Works, Inc.

Packaging Machinery 64

Pneumatic Scale Corp., Ltd.—Two bulletins. No. S-108, a 12-page bulletin illustrating and describing the bottle filling, capping and labeling machines made by this company. Bulletin No. 111, "Automatic Packaging Machinery," illustrated with photographs and line drawings of the Hi-speed equipment for making and filling packages with dry products. Contains installation photographs and specifications.

Vibrating Screens 65

Productive Equipment Corp.—10-page bulletin, No. 147, on Selectro vibrating screens for the food processing industry. Contains schematic drawings of catsup and tomato juice line showing suggested location of vibrating screens for producing juice without squeezing. Illustrated with many installation photographs and drawings.

Stainless Steel Tubing 66

Babcock & Wilcox Tube Co.—Bulletin TB-323 describes some of the important properties of B&W stainless tubing. A number of applications are outlined. Also available is a revised version of the conversion tables which convert inches and fractions of inches to decimal parts.

Heat Exchangers 67

The Duriron Co.—4-page bulletin, No. 1603, on Durco heat exchangers for heating and cooling corrosive solutions. Bulletin 617, 2 pages, giving complete details on Durco corrosion-resistant top lubricated plug valves.

Freeze-Drying 68

F. J. Stokes Machine Co.—18-page catalog, "Stokes Freeze-Drying Equipment." Contains many installation photographs, descriptions and useful information, including 2 pages of reference charts and tables.

Process Equipment 69

S. D. Hicks & Son Co.—6-page illustrated folder, "Engineers, Designers, Fabricators for the Process Industry." Describes, with photographs and line drawings, process equipment designed and made by this company.

Magnetic Separators 70

Stearns Magnetic Mfg. Co.—Bulletin No. 92, 8 pages, illustrated with photographs and line drawings describing the spout-type magnetic separators that provide protection against tramp iron at low cost.

Materials Handling

Caster Manual 71

A 44-page industrial caster manual, containing general information, technical data and illustrations printed in four colors has just been issued by the Rapids-Standards Co., Inc.

Roller Conveyors 72

PeKay Machine & Engineering Co.—Circular on the Panaflex roller conveyors available in three standard sizes and in any lengths.

Liquid Handling 73

Ertel Engineering Corp.—20-page, 2-color catalog-15, on the filters, filter sheets, bottle fillers, cappers, mixing and other liquid-handling equipment,

HOW TO GET THIS LITERATURE

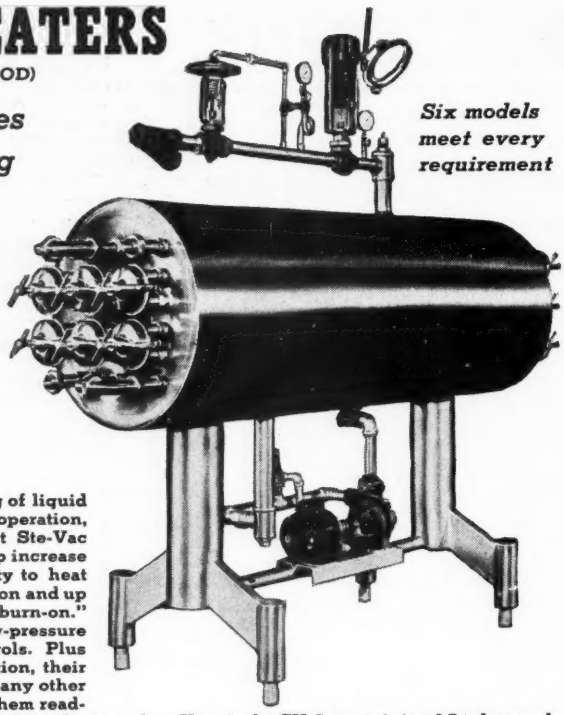
Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

STE-VAC HEATERS

(FOR LIQUID FOOD)

High Temperatures
Sustained Heating
No "burn-on"

- 5,000 to 40,000 lbs. per hour capacity
- Quickly adapted to practically any liquid food heating operation



Six models meet every requirement

If high temperature processing of liquid foods is part of your plant operation, you'll want to know all about Ste-Vac Heaters and how they can help increase production. About their ability to heat up to 190° in one stage operation and up to 240° in two stages—without "burn-on." Plus their utilization of dry, low-pressure steam under self-acting controls. Plus their stainless steel construction, their ease of installation and the many other Ste-Vac features which make them readily adaptable to your plant and product, and assure you of maximum heating efficiency.

There's a Ste-Vac Heater for your particular needs. Write for detailed information and specifications.

Here is the SV-8, containing 18 tubes each 6' long. This heater can handle 6,000 pounds of liquid food per hour in heating from 40° to 190°. Floor space 2' by 8'. Shipping weight 2,000 pounds.

Designers and manufacturers of foods handling equipment since 1899.

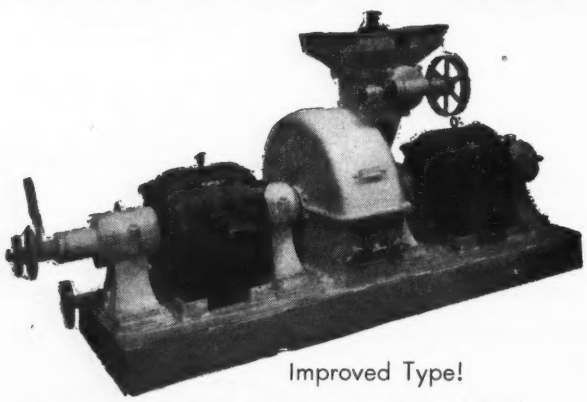
CHESTER DAIRY SUPPLY CO.

5TH AND TILGHMAN STREETS — CHESTER, PA.

ROBINSON

PROCESSING UNIQUE EQUIPMENT

ATTRITION MILLS



Improved Type!

Attrition Mills for grinding all types of material. Adjustable for coarse or fine grinds. Hard iron grinding plates. Capacities to your requirements. Robinson Processing Equipment is designed by engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

for both plant and laboratory, made by this company. Contains many photographs and line drawings, as well as descriptions of the various items.

Bridge Ramp 74

A new folder describing the "One Man Bridge Ramp," designed for use with fork trucks on railroad sidings, is now available from the Elizabeth Iron Works. An accompanying survey and specification sheet is included so that anyone who is familiar with material handling may select the correct size and type of ramp.

Conveyors 75

Lamson Corp.—4-page, 2-color folder on Lamson products, illustrates and describes the complete line of conveyors and carriers made by this company.

Hand Trucks 76

The Ace Co.—Folder describing the entire line of new hand trucks made by this company. Contains tables of specifications and prices.

Steel Conveyors 77

Steel-Parts Mfg. Co.—14-page catalog on the Steel-Parts all-steel low cost conveyors. Illustrated in color with line drawings and application photographs. Contains 2 pages of specifications.

Control Equipment

Automatic Controls 78

General Controls Co.—52-page catalog No. 52-C covering the complete line of automatic pressure temperature and flow controls made by this company.

Control Equipment 79

A 4-page color bulletin, giving a complete technical description of Xactline Straight Line Temperature Control, an instrument that holds tolerances as close as ⅛ deg. F., and on-off cycles as short as 3 sec., has been issued by Claud S. Gordon Co.

Flow Meters 80

A new 24-page bulletin describing FLOWRATOR instruments has been released by Fischer & Porter Co. It includes descriptions and illustrations of instruments, both assembled and disassembled. Numerous new accessories are shown. Details of front and rear panel mounting, rear lighting arrangements, steam heating coils and alarm devices are included.

Control Devices 81

"Industrial Control Devices"—55-page catalog, No. 8302, recently published by the Brown Instrument Co., contains important and useful information on electric and pneumatic automatic control systems. Accurate and dependable industrial control devices and safeguards are fully described, with complete schematic diagrams, dimensional drawings, photographs, specifications and range charts.

Refrigeration Control 82

Penn Electric Co.—Form 2601, a 4-page broadside describing Penn "270" refrigeration control featuring 2-pole construction. Contains illustrations, descriptions and specifications.

Steam and Liquid Controls.....83

Catalog 47, Steam and Liquid Control Equipment, containing 48 pages, has been issued by O. C. Keckley Co. Valves, precision pressure regulating, relief and float; temperature regulators; self-cleaning strainers; water gages; gage cocks; illuminators; steam traps and

air separators are described. Includes dimensions, application, capacity, list price and engineering tables and specifications.

Plant Supplies

Salt 84

Leslie Salt Co.—30-page pamphlet describing the method of evaporating, purifying and packaging salt from ocean brines. Numerous photographs are included.

Chemicals 85

Los Angeles Chemical Co.—64-page pocket size booklet giving an alphabetical listing of the industrial and agricultural chemicals available from this company. Contains several pages of detailed information on some of the products made by this company and their more important applications.

Silicones 86

Dow Corning Corp.—12-page catalog describing the various silicone products made by this company. These include greases, fluids, varnishes, resins. Physical properties are tabulated, and some of the important characteristics are described.

Lubrication 87

Fiske Brothers Refining Co.—27-page illustrated Lubriplate service handbook. Describes the different types of Lubriplate lubricants with recommendations as to their uses. Contains lubrication survey chart and list of distributors.

Flavors 88

Polak & Schwarz, Inc.—35-page flavor catalog. Lists regular line items and incorporates information regarding contents, manufacture and use of products.

Packings 89

Raybestos-Manhattan, Inc.—16-page catalog containing illustrations and descriptions of the most popular styles of mechanical packings made by this company. Includes a recommendation chart showing the style numbers of packing recommended for various types of services.

Miscellaneous

Incinerators 90

Plibrico Jointless Firebrick Co.—Bulletin on Plibrico Rubbish Destructor, a sturdy, air-cooled incinerator which is erected in four standard sizes with capacities of 10, 20, 40 and 60 cu. yd. of dry rubbish consumed per 8 hr.

Odor Control 91

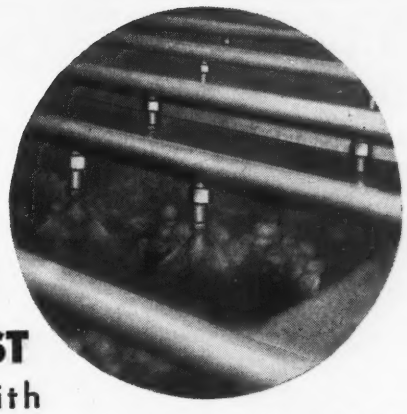
Cargille Scientific, Inc. — 10-page booklet, "Scientific Odor Control," which describes in detail the Crocker-Henderson odor system.

Profits 92

Charles H. Welling & Co., Inc.—"Profit Margins Can Be Protected in a Buyer's Market by New Products, New Processes and Diversification," a folder telling of a proven technic for the preservation of profit margin.

Insulation 93

Monsanto Chemical Co.—42-page brochure featuring Santocel, the chemical insulation made by this company. Contains information on physical and chemical properties, applications and thermo-conductivity. Well illustrated with installation sketches, performance curves and methods of application.



a picture of

FAST LOW COST

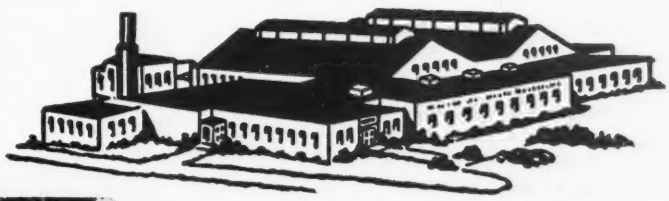
Cooling with Spraying Systems **SPRAY NOZZLES**

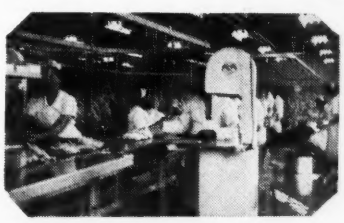
Spraying Systems Spray Nozzles installed in your food cooling and processing equipment can speed up operations and lower your costs. At least, experience to date has proved this fact. The reason is specialization in spray nozzle design and manufacture . . . that gives you precision nozzles in a wide range of types and sizes to meet your requirements exactly. Let a Spraying Systems representative give you the facts. Write for Catalog No. 22 . . . a 32-page reference manual listing thousands of nozzle types and capacities.

SPRAYING SYSTEMS CO.

4061 West Lake Street • Chicago 24, Illinois

SPECIALISTS IN SPRAY NOZZLE DESIGN AND MANUFACTURE



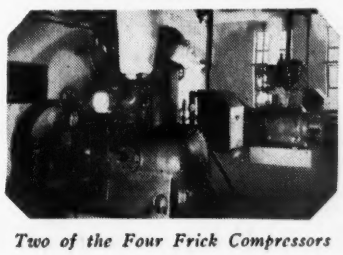


Part of the Poultry Processing Line

Processing 24,000 Chickens Daily with

FRICK Refrigeration

Frozen Chickens in –5° Storage



Two of the Four Frick Compressors

They do it in the new plant of the Southern States Eastern Shore Marketing Cooperative, at Salisbury, Md. • Here 56,000 birds are kept on hand; the entire daily pack is cooled to 35° F, and half the chickens are quick-frozen at minus 35°. One of the storages is kept at 32°, the other at minus 5°: each holds 200,000 lb. of poultry. Up to 25 tons of ice are made per day, for precooling and shipping purposes. • Frick Refrigeration handles all the cooling work. For that important Refrigerating, Ice-making or Air Conditioning job of yours, get in touch with

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Look at YOUR package as customers do

Imagine that you are a retail buyer. Take a look at your label. Does it contain information which will help you make a wise purchase?

Your customers, the housewives and mothers of 1947, are influenced by the nutritional value of the foods they buy. The words "Vitamin Enriched" on your label tell them that they are making a wise purchase.

Have your label work for you all the time . . . and in all ways. Have it show that potent, one-word sales maker—"Enriched."

Get all the facts now on possible enrichment of your product from 'Roche'—the company with the widest technical experience in the improvement of food products by vitamin addition.

NOTE TO FREEZERS AND CANNERS:
If you have not received copies of our new 1947 brochure on the anti-oxidant use of Vitamin C in fruit freezing, and reprints on Vitamin C in home canning, write to 'ROCHE' Vitamin Division.

'ROCHE' *Vitamin Division*

HOFFMANN-LA ROCHE, INC., NUTLEY 10, NEW JERSEY

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

CEREAL PRODUCTS

Wheat Starch Process

SEPARATION of starch and gluten from wheat and milled wheat flours, recovering products of high purity and yields, is the subject of recently issued patents. Broadly, the process involves forming a dough containing starch, gluten and water, washing the dough to extract the starch from the gluten, and recovering the starch from the resultant slurry. Six different flowsheets are described, each employing one extraction and two washing steps. The starch slurry obtained from the extractor is subjected to a sequence of steps performed in different manner in the various flowsheets, but all designed to obtain starch of high yield and purity. An antiseptic such as sodium or potassium nitrite may be employed in the system to counteract fermentation of starch. An additional function of this chemical is in preventing denaturization of the gluten during drying and in toughening the gluten to prevent loss and contamination of the starch.

Digest from U. S. Patent 2,418,621, issued April 8, 1947, on an application dated August 4, 1943, to Robert W. Callaghan and Richard H. Schilling, Minneapolis, Minn.; and from 2,418,669, issued April 8, 1947, to Robert H. Schilling, Minneapolis, Minn., both assigned to General Mills, Inc., a corporation of Del.

BAKING

Dry Yeast in Bread

NONVIABLE dry yeast, added to the bread formula for enhancing the nutritional value, results in the production of loaves that do not score high by conventional scoring methods. The principal trouble is a pronounced dough softening effect that persists throughout the breadmaking process. To study this characteristic, baking tests were conducted with a formula containing 3 percent (flour basis) of 15 different dried nonviable yeasts as received and after different treatments. The major factor responsible for softening of bread doughs was found to be water-soluble reducing substances in the yeast; another is enzymatic in character. The studies indicate that dry yeast of improved breadmaking qualities can be produced by heating the yeast to boiling temperature before drying, thus releasing the reducing substances which can then be oxidized, and destroying the enzymes.

Digest from "A Study of the Behavior of Nonviable Dry Yeast in Bread Dough," by C. F. Davis and G. Frenkel, *Cereal Chemistry*, vol. 24, no. 2, 100-110, March, 1947.

FRUIT PRODUCTS

Sulphite Dips for Fruit

WARTIME consideration of increasing the production of dried peaches and pears in Australia led to the investigation of sulphite dips of the peeled fruit prior to dehydration. Comparison was also made with ordinary methods of sulphuring. Dip solutions comprised sodium sulphite alone or with the addition of increasing amounts of sulphuric acid; pure sulphurous acid prepared from liquid sulphur dioxide; or a mixture of sulphurous acid and sodium sulphite containing equal amounts of sulphur dioxide. All contained two percent of available sulphur dioxide but had pH values covering the range 1.2 to 10.4. The period of immersion ranged from 1 to 5 min., after which the products were dehydrated. Samples were tested for SO_2 and moisture; pH determinations and cooking tests were also made. Storage trials were made on some samples to compare the keeping qualities of the dipped fruit with that sulphured in the usual manner. Results showed that satisfactory products could be made by dipping. The amount of sulphur dioxide retained depends largely on the pH of the dip solution; the higher the pH the greater the retention. Flavor is unfavorably affected by high pH dips, but this can be overcome by adding citric acid when cooking. Also, at high pH the staining of the fruit from iron contamination by the cutting knives was more pronounced. Samples with high initial sulphur dioxide content kept best in storage.

Digest from "Investigations on the Use of Sulphite Dips in the Drying of Peeled Pears and Peaches," by E. C. Orton, *Journal of the Council for Scientific and Industrial Research*, vol. 19, No. 1, February, 1946.

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DEHYDRATION

Dehydrated Butter

PRESERVING butter by dehydration, without removal of other non-fat constituents, is proposed in a patent recently disclosed. Butter is melted and vacuum-dried to a moisture content of less than 5.0 percent at a temperature not exceeding 122 deg. F. It is then poured into containers and allowed to solidify. It is reconstituted by melting at gentle heat, adding water, and emulsifying at 80 deg. F. for 40 minutes. The emulsion is chilled for 2 hours, after which it is removed and worked to a smooth consistency.

Digest from U. S. Patent 2,418,645, issued April 8, 1947, on an application dated December 14, 1942, to Jakob L. Jakobsen, Minneapolis, Minn., and assigned to General Mills, Inc., a corporation of Delaware.

Dehydrating Foodstuffs

ELIMINATING blanching or treatment with sulphur dioxide in dehydrating fruits and vegetables is the object of a recently patented process. The crux of the process is the preliminary evacuation of air

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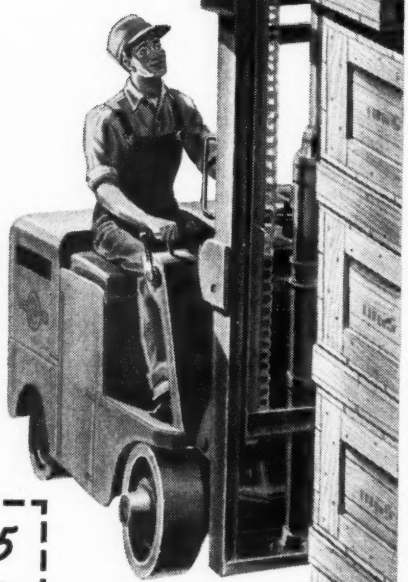

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from the intercellular spaces of the material, and replacement with water or an aqueous solution. It is claimed that dehydration proceeds more rapidly than with the same material containing its original intercellular air. Removal of intercellular air and replacement with water are accomplished by submerging the foodstuff, suitably prepared, in an air-tight container for 5-10 min. at a pressure of less than 1 in. Hg, followed by a 5-min. impregnation period at atmosphere pressure. Any desired means of dehydration may then be employed to produce the final product.

Digest from U. S. Patent 2,415,995, issued February 18, 1947, on an application dated August 14, 1943, to Harold K. Derby, and assigned to F. E. Booth Co., Inc., San Francisco, Calif.

MICROBIOLOGY

Inhibiting Bacteria

INHIBITION or retardation of the growth of micro-organisms in meat is the subject of a recent patent. An acetate containing combined but undissociated acetic acid in its molecule, preferably sodium diacetate, is the inhibitor. It may be applied in dry or liquid form as a composition containing an adhesive base such as gelatin, agar agar, starches, dextrines, or other edible adhesives. In the dry form the composition may contain from 15 to 85 percent complex acetate and 85 to 15 percent dry adhesive base. In liquid form the composition will be the same, with the addition of water or other liquid carrier, the quantity of which will depend on the adhesive base. Several examples of application are given in the specifications.

Digest from U. S. Patent 2,417,806, issued March 25, 1947, on an application dated July 24, 1940, to Hans F. Bauer and Elmer F. Glabe, Chicago, Ill., and assigned by mesne assignments to Stein, Hall & Co., Inc., New York, N. Y.

Heat Resistance of Cheese Lactobacilli

APPROXIMATELY 83 percent of the lactobacilli in Cheddar cheese made from raw milk could be killed in 30 min. or less at 145 deg. F., but those in Cheddar cheese made from pasteurized milk were much more heat resistant, having a thermal death time of 10 to 35 min. at 154 deg. F., according to a recent investigation.

Tests of 60 lactobacillus cultures found in Cheddar cheese made from raw milk showed their heat resistance to vary within wide limits, although the variation was not

(*Continued on page* 176)

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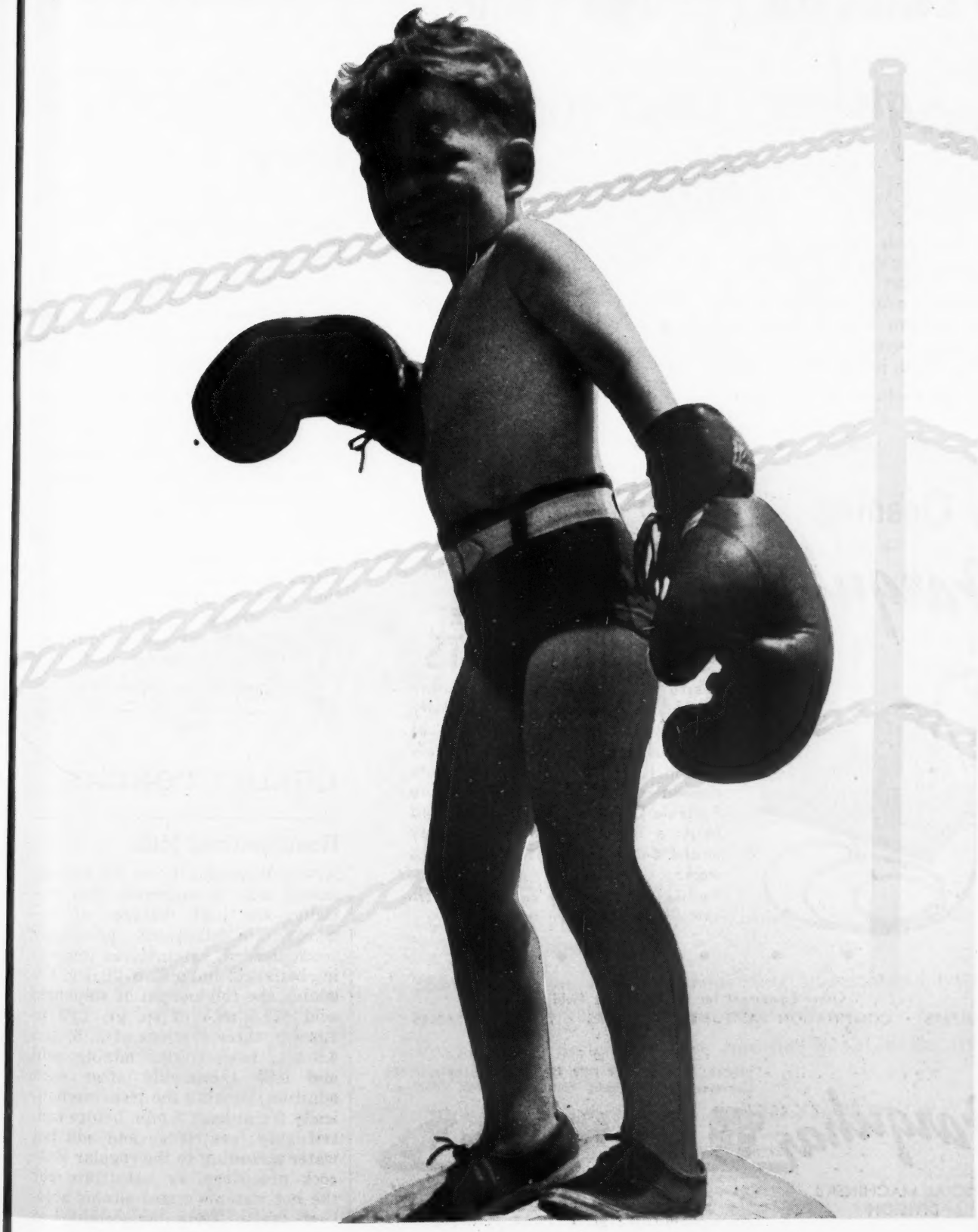

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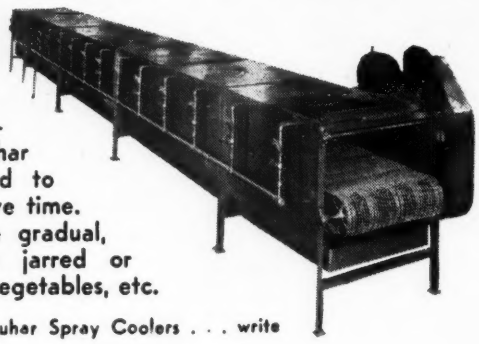

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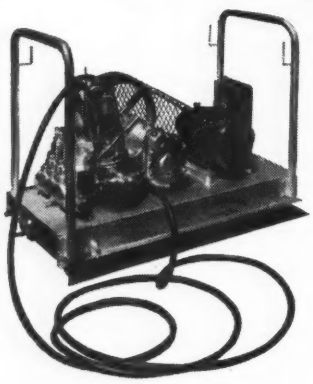

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great when the thermal death time was less than 30 min. at any temperature. Their destruction by pasteurization suggests the possibility of accelerating the ripening of Cheddar cheese made from pasteurized milk by adding the proper lactobacillus to the milk, or by raising the ripening temperature of the cheese to afford a more favorable growing temperature for the reduced numbers of organisms that survive pasteurization.

Digest from "The Heat Resistance of Lactobacilli Found in American Cheddar Cheese," by W. L. Slatter and H. O. Halvorson, *Journal of Dairy Science*, vol. 30, no. 4, 231-243, April, 1947.

MEATS

Tenderizing Meat

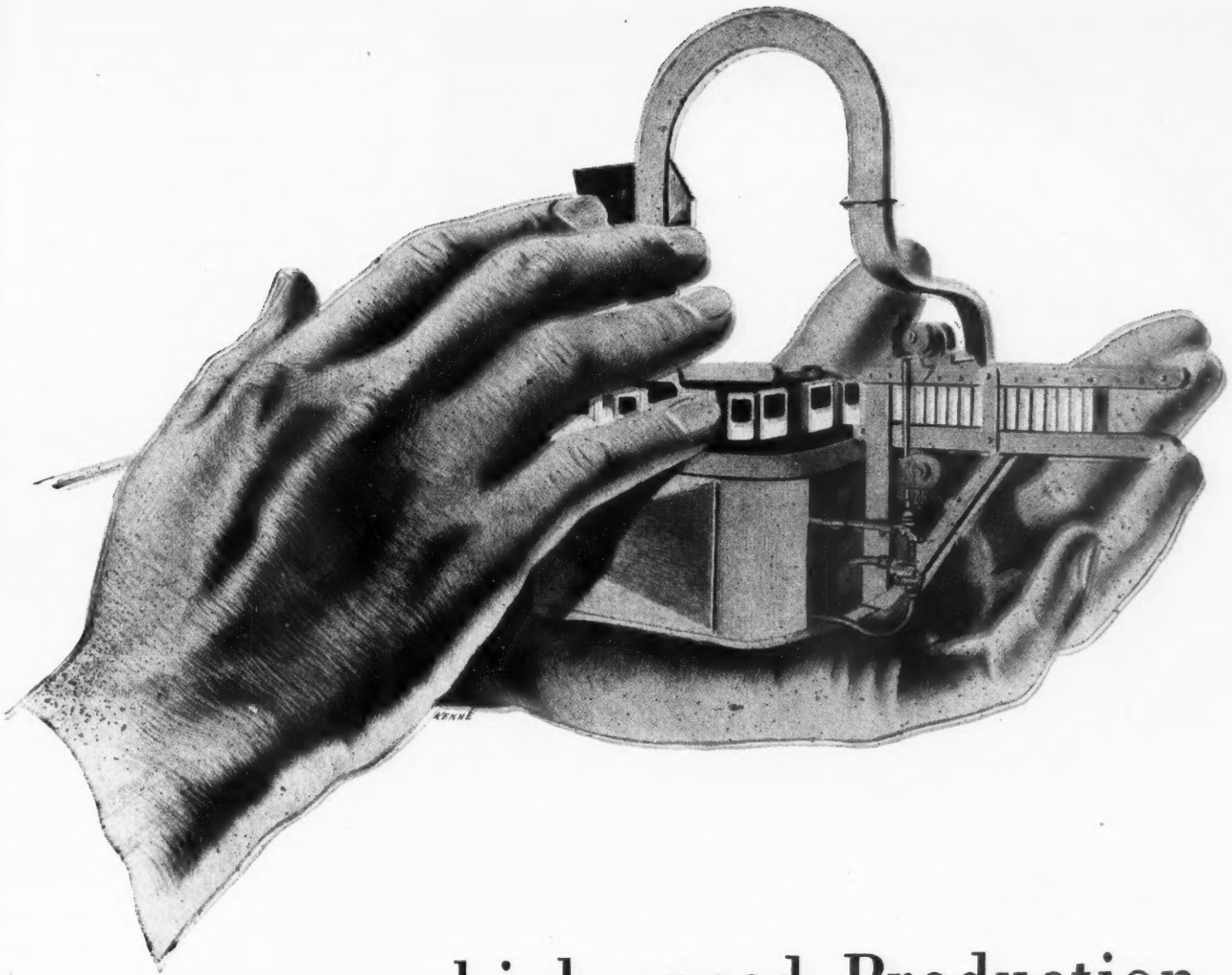
FORCIBLE disruption of fibrous tissue in meat, which is the usual cause of toughness, is the basis of a method for tenderizing meat revealed in recent patent specifications. Meat is subjected to a spray or stream of particles of fatty substances, enzymes, fatty acids, vitamins or minerals, under a pressure of 1,000-7,000 lb. per sq. in., through a nozzle having openings 0.0001 in. in diameter. The tenderizing materials may be sprayed in liquid suspension, in solid powder form, or in emulsion or dissolved state. It is claimed the mechanical disruption of the fibrous portion of the meat permits chemical and physical changes during ripening and cooking to proceed more rapidly, resulting in a tender product.

Digest from U. S. Patent 2,418,914, issued April 15, 1947, on an application dated August 1, 1944, to Vladimir Leslie Tichy, Cleveland, Ohio.

QUALITY CONTROL

Homogenized Milk

A NEW Babcock fat test for homogenized milk is suggested that embodies the best features of numerous modifications previously recommended. It involves tempering both acid and milk to 70 deg. F.; adding the full amount of sulphuric acid (17.5 ml.) of sp. gr. 1.83 to 1.835 in three portions of 8, 5, and 4.5 ml., respectively; mixing acid and milk thoroughly after each addition; shaking the tests mechanically for at least 2 min. before centrifuging; centrifuge and add hot water according to the regular Babcock procedure, or substitute for the hot water a water-alcohol solution (ratio 1.4:1 by weight) to



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bring the fat into the neck of the bottle. The experimenters checked their procedure on 36 samples of homogenized and non-homogenized milk, and ran a duplicate set by the Mojonnier method. The arithmetic-average fat test of the homogenized milk was 0.018 percent lower than that of the same test on similar milk not homogenized. The arithmetic-average variations of the 36 tests from the Mojonnier tests were plus 0.058 and plus 0.045 percent for non-homogenized and homogenized milk, respectively.

Digest from "A Suggested Modified Babcock Procedure for Testing Homogenized Milk," by P. S. Lucas and G. M. Trout, *Journal of Dairy Science*, vol. 30, No. 2, 95-102, February, 1947.

ASSAY METHODS

Vitamin A Estimation

ACTIVATED glycerol dichlorohydrin is recommended as a colorimetric reagent for the quantitative determination of vitamin A in fish liver oils, according to a procedure recently developed. The new method was evaluated by comparing results against the Carr-Price reaction and the ultraviolet absorption method, using both the whole and the unsaponifiable fractions of oils. The investigators found good agreement between values obtained by the glycerol dichlorohydrin and the antimony trichloride methods, and they recommend the former as possessing many advantages over the Carr-Price reagent. Complete details of procedure and analytical results are given in the original article.

Digest from "Determination of Vitamin A in Fish Liver Oils with Activated Fish Liver Oils," by A. E. Sobel and H. Werbin, *Analytical Chemistry*, vol. 19, No. 2, 107-112, February, 1947.

Carotene Separation

HEAT-TREATED diatomaceous earths are very effective adsorbents for the separation of carotene from accompanying pigments. The Johns-Manville brands: Hyflo Super-Cel; Celite 501, 535 and 545 are all satisfactory for chromatographic adsorption, but Hyflo Super-Cel is the strongest adsorbent for the carotenoid pigments. It is useful for determination of carotene in silage, but cannot be used for tomatoes as it does not separate carotene from lycopene. Hyflo has only slight adsorptive power for vitamin A ester, and so may be used for determination of vitamin A in mixed feeds.

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Chromatography by this method is very rapid and requires minimum manipulation. Solutions of 4 percent acetone in petroleum ether give more complete extraction of carotene from dehydrated alfalfa meal than petroleum ether alone in the customary 16 hr. contact extraction. The latter gives consistent results and is useful for routine work.

Digest from "Chromatic Determination of Carotene—Kieselguhr as a Chromatographic Adsorbent," J. B. Wilkes, *Industrial and Engineering Chemistry*, Analytical Edition, vol. 18, No. 11, 702-707, November, 1946.

VITAMINS

Corn Grits Enriched

DEGERMINATED corn grits can be uniformly enriched with synthetic vitamins and iron by adding an enriched premix that acts as a vehicle for the addition of thiamine, riboflavin, niacin and iron at any practical enrichment levels.

The current investigation is concerned with premixes of enriched corn grits prepared therefrom. Uniformity of enrichment, retention of nutrients in washing and cooking, stability during storage and nutritional availability of the vitamins to human subjects were investigated. The premix suffers only slight losses in washing, and is also resistant to storage and cooking losses. The human availability of the vitamins in enriched grits was demonstrated quantitatively with a human bioassay technic.

Digest from "The Enrichment of Corn Grits with Synthetic Vitamins and Iron," by M. F. Furter, W. M. Lauter, S. H. Rubin, and G. F. Siemers, *Transactions American Association of Cereal Chemists*, vol. 5, no. 1, 26-36, April, 1947.

MATERIAL

Preventing Rust on Cans

SUCCESSFUL application of a film of lacquer on tin cans to prevent rusting depends on the cleanliness of the can surface. If, at the time of cleansing, the surface can also be desensitized with sodium dichromate and the entire operation carried out during the processing time, substantial savings will result and the tendency to rust will be greatly minimized.

Samples of tinplate were tested under processing conditions (240 deg. F. for 2½ hr.) by subjecting them to the action of various detergents, with and without the addition of sodium dichromate. Similar

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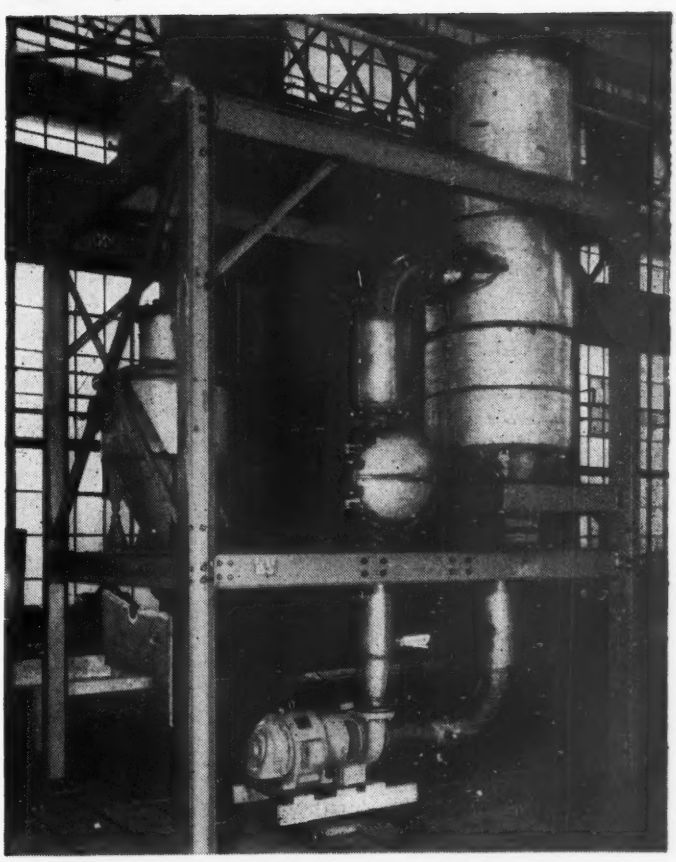

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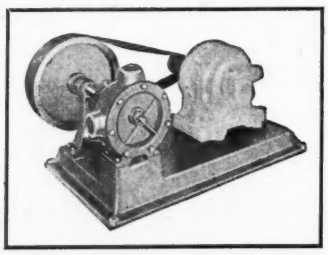

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experiments were also made with samples of tinplate in contact with strips of mild steel to simulate conditions prevailing in an iron retort. Detergents used were sodium hexametaphosphate, trisodium phosphate, sodium carbonate, sodium hydroxide, and sodium metasilicate. In all tests with detergents alone, the tinplate feathered more or less heavily. Feathering was even more pronounced in those tests made with mild steel in contact with tinplate. With dichromate present, however, feathering was absent in certain concentrations of detergents, of which sodium hexametaphosphate gave best results. Exposure tests of cans treated with detergents and dichromate from 0.1 to 1.0 percent showed little signs of rusting after three weeks.

Digest from "Rust Prevention on Cans," by R. A. Gillies, *Food Processing, Packing, Marketing*, London, vol. 16, no. 186, 81-84, March, 1947.

MISCELLANEOUS

Gelatin Food Product

FUMARIC acid used in the preparation of an edible gelatin product, is the feature of a recent patent. This acid imparts an acid taste, reduces the amount of gelatin required to give a gel a certain value of set, and improves the keeping qualities of the product by imparting a water repellent property. Fumaric may be used alone or in combination with other acids such as tartaric, but when used alone it is as effective as about twice the amount of tartaric. A product suitable as a dessert may contain 8 to 12 parts gelatin, 80 to 95 parts sugar, 0.75 to 2 parts acid as fumaric or admixture of fumaric and tartaric, and a small amount of flavor.

Digest of U. S. Patent 2,412,305, issued December 10, 1946, on an application dated July 20, 1943, to William E. Stokes and Margaret H. Kennedy, and assigned to Standard Brands Incorporated, New York, N. Y.

Short Time Radiation

ULTRA-SHORT applications of penetrating electrons offer a means of sterilizing and preserving food in the raw state. They suppress undesired side reactions, except for the most rapid chemical and biological reactions.

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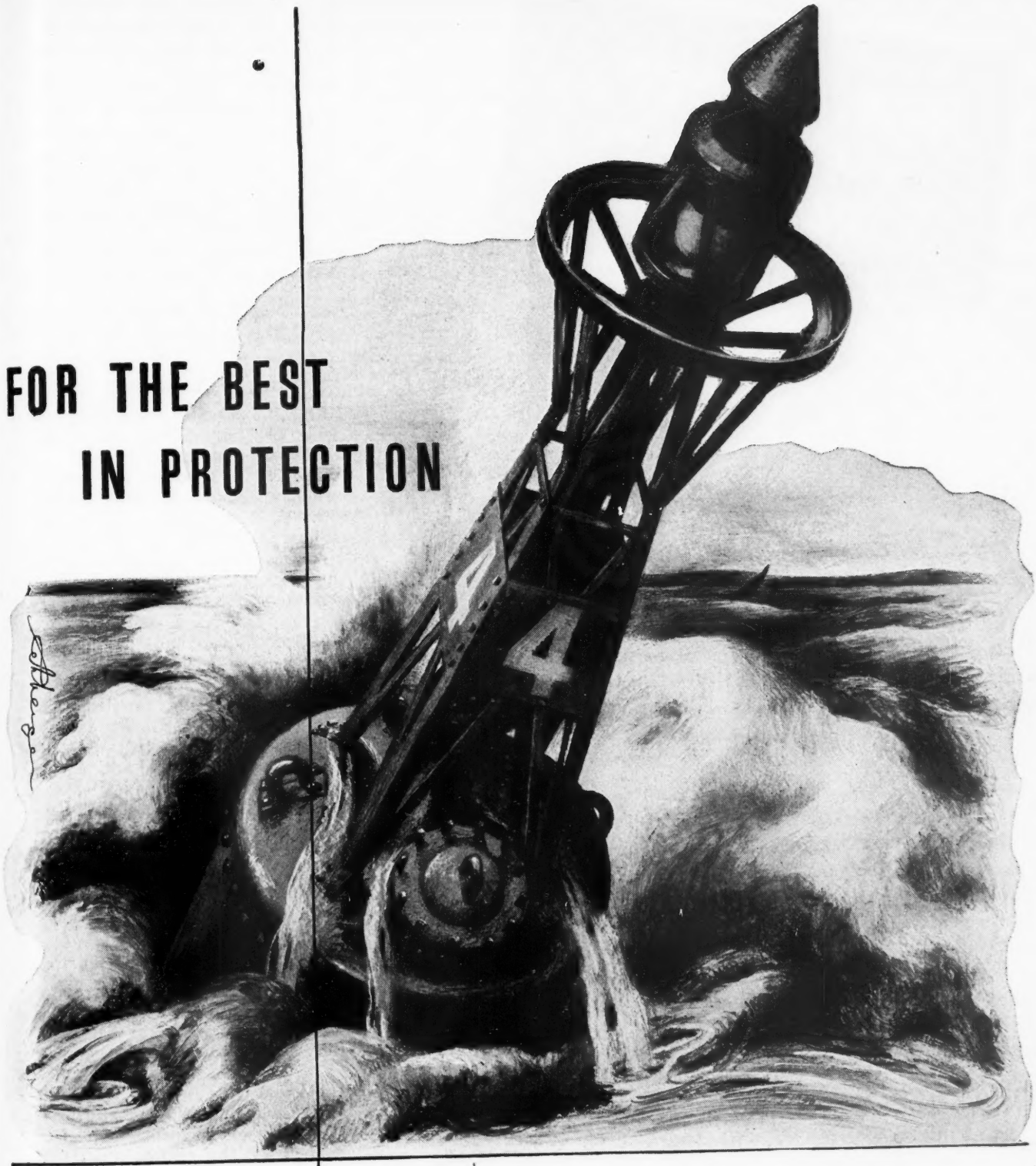

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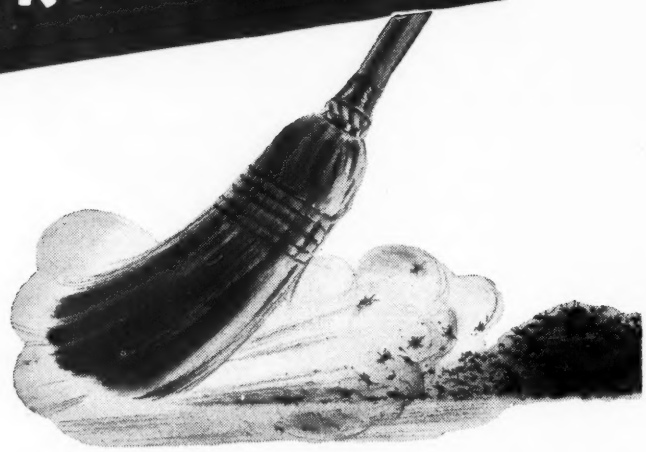

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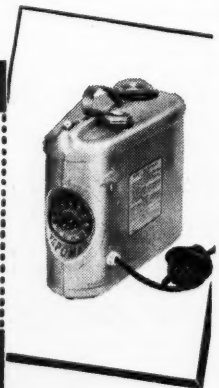

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of a second, a wide variety of meats, sea foods, dairy products, vegetables and fruits were tested with impulse dosages 3-15 times the sterilization dosage. Enzyme inhibition was obtained without marked changes in taste, odor, or appearance. Dairy products were susceptible to change in taste, but were successfully treated under special conditions. Change in the red color of certain foods, which occurred at room temperature, were eliminated by treatment at –40 deg. F.

Digest from "Ultrashort Application Time of Penetrating Electrons," by A. Brasch and W. Huber, *Science*, vol. 105, no. 2718, 112-117, January 31, 1947.

Floating Fish Factory

RECENTLY patented is a fishing vessel of the trawler type, completely equipped for processing fish at sea. When the net is hauled and the fish are dumped on deck, edible fish are pitched down chutes to cutting tables where they are filleted and cleaned. Fillets are quick-frozen and packed for storage in the hold within 2 hr. of the time they are caught. Livers are cooked and extracted. Refuse and inedible fish are cooked to extract oils and fats, and the remainder is crushed, dried, and bagged as fertilizer. The fish processing machinery is in a balanced position in the ship relative to the propulsion machinery, so that the ship always rides on even keel regardless of the weight of the load in the cargo space.

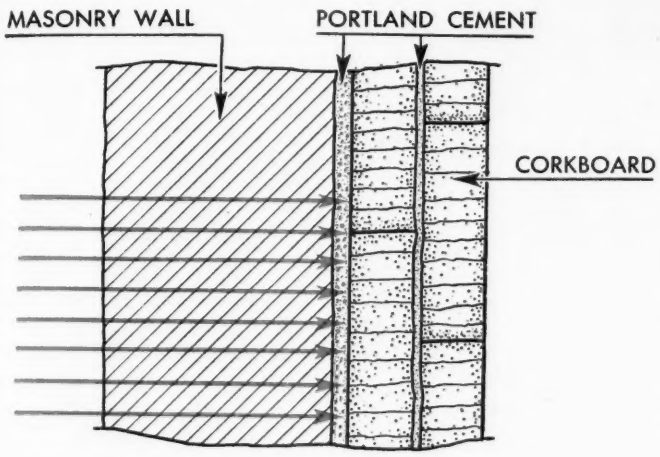
Digest from U. S. Patent 2,413,918, issued January 7, 1947, on an application dated July 9, 1945, to Leonard B. Harris, Southold, N. Y.

Simulated Glace Fruit

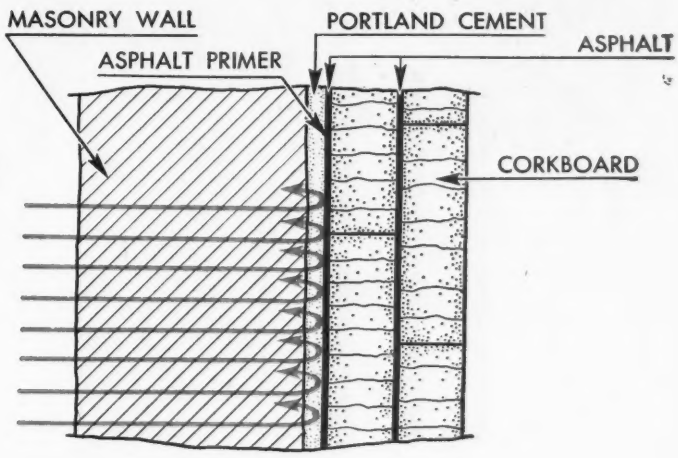
LOWERED production cost and time are features of a recently patented process for producing simulated glace fruits from sugar beet root. Sugar beet root with a sugar content of 15 percent is peeled, cubed, and treated to prevent oxidation and blackening. The material is then treated to hydrolyze about 50 percent of the sugar into invert sugar within the beet cell. At the same time, or subsequently, the material is dehydrated to increase the density of the liquid phase to a value in excess of 66 Brix. The required time is one hour or less, compared with 10 to 30 days for impregnating fruit materials. Treatment of sugar beet seed to increase the quantity of invert sugars in the beet root is also described.

Digest from U. S. Patent 2,418,558, issued April 8, 1947, on an application dated February 25, 1944, to William Schloessinger and Alexander M. Zenzes, New York, N. Y.

HOW ASPHALT STOPS AIR



Use of portland cement mortar to install insulation permits air and moisture infiltration.



Erection of insulation by the asphalt specification seals out moisture laden air.

MOST low-temperature insulation today is erected by using the asphalt specification. Twenty-five years ago, most of it was erected in portland cement mortar. This change in specifications has greatly improved the efficiency of low-temperature applications.

In the 1920's the average temperature required in refrigerated spaces was about 32° F. Even at that temperature, portland cement without moisture protection was not entirely satisfactory. For portland cement alone, like most materials, can't keep out air. One square foot of 13-inch brick wall, with ½" of portland cement plaster, at 40 pounds pressure allows more than 100 cubic feet of air to pour through in an hour. This air carries moisture which condenses, lowers insulating efficiency, and weakens the insulation bond.

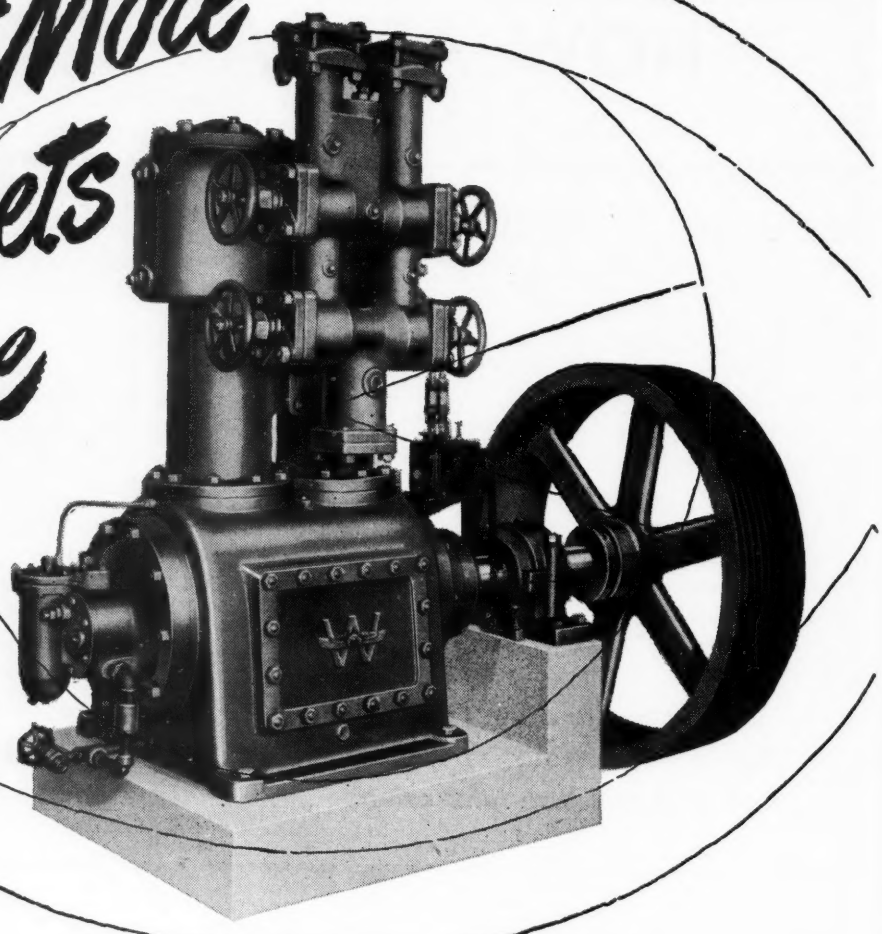
In addition, when processing and holding temperatures began plummeting down—to zero and 30 below—more trouble started. The air-pressure and vapor-pressure differentials between the inside and outside of refrigerated rooms and buildings grew wider apart. And the moisture pouring into the structure turned to ice, often pushing the insulation from the wall.

The Armstrong Research Laboratories developed the asphalt specification after exhaustive tests of many different erection methods. This specification overcame the weakness of the portland cement method and has since become a standard in the industry. Asphalt, it was found, is an excellent adhesive—and because its permeability to air is practically zero, it eliminates moisture penetration, the chief weakness of the portland cement method.

The asphalt specification still uses portland cement as a back plaster to true up masonry walls. But it also calls for a coat of asphalt priming paint over trued-up masonry walls, plus erection in hot asphalt. This has proved to be a most practical method—effective, easy to handle, low in cost. It is also typical of Armstrong research and product improvement. Many important developments in the low-temperature insulation field have come from Armstrong and there will be others in the future.

For the complete specifications write today to Armstrong Cork Co., Building Materials Division, 4207 Concord Street, Lancaster, Penna.

You Get More Than Meets the Eye



in your Worthington Refrigeration Compressor

THINGS YOU CAN SEE . . . in this Vertical, Two Cylinder, Single-Acting enclosed Compressor, are features designed to give you long life and reliable service at minimum maintenance cost:

- All sizes have main bearings of self-aligning, double-row roller type. Three larger units equipped with outboard bearings incorporating same features.
- Cylinders, bearings and pins are pressure lubricated.
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- Safety head on discharge reduces slop-over hazard.
- Trouble-free two-piece construction of Worthington QD Sheave and Hub combines the three basic sheave requirements: *Easy to Get On, Easy to Get Off, Yet Always Tight on the Shaft.*
- Manifold of the unit type . . . with stop, by-pass and pump-out valves . . . improved quick-opening relief valve.

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THINGS YOU CAN'T SEE . . . include Worthington's *skill in application* that accounts for the vast number of Worthington installations in the food industry . . . Worthington *engineering ability* that has solved hundreds of difficult problems in gas compression . . . Worthington *manufacturing skill* that accounts for Worthington's large production of critical components for the high side of the refrigeration cycle. All these factors enable Worthington to offer you an integrated, efficient installation that exactly fits your needs.

For further proof that *there's more worth in Worthington*, talk things over with your nearby Worthington Distributor, or write for Bulletin direct to *Worthington Pump and Machinery Corporation, Harrison, N. J. Specialists in air conditioning and refrigeration machinery for more than 50 years.*

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A7-8

FIVE MORE REASONS WHY WORTHINGTON LEADS IN INDUSTRIAL REFRIGERATION

Horizontal compressors for all types of refrigerants

Angle gas engine compressors

Centrifugal compressors

Compressors for Low Pressure Refrigerants

Shell and tube refrigerating equipment

BOOKS

Wooden Barrels

THE COOPERAGE HANDBOOK. By F. P. Hankerson. Published by Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y., 1947. 182 pages; 5½x8¾ in.; cloth. Price, $3.75.

The food and beverage manufacturer who requires wooden barrels for the storage and shipment of his product will find just about all the information he needs in this little volume. It brings together heretofore widely spread data on specifications, handling, storing, carloading, lining, opening and closing that will enable the user to make the proper choice.

A special section is devoted to beer barrels and their care.

Public Relations

YOU AND YOUR PUBLIC. Revised Edition. By Verne Burnett. Published by Harper and Brothers, 49 E. 33rd St., New York, N. Y., 1947. 205 pages; 5¾x8¾ in.; cloth. Price, $3.

The value of public relations to business is recognized today, whether it applies to an individual, a small company or a large corporation. Public relations is not press agentry, nor is it publicity. It might be defined as the art of making others see you as you see yourself.

While the book does not deal specifically with the food industry, a large portion of the author's experience was gained in 14 years as an executive with General Foods. Because it covers so many phases of this important subject, the book should be of value to all business executives. It should be particularly helpful to the small operator as an aid to avoiding pitfalls in both public and employee relations.

Methods

METHODS OF VITAMIN ASSAY. Edited by The Association of Vitamin Chemists, Inc. Published by Interscience Publishers, 215 Fourth Ave., New York 3, N. Y., 1947. 189 pages; 6¼x9½ in.; cloth. Price, $3.50.

In 1943 the Association of Vitamin Chemists was organized. Its purpose was three-fold: The exchange of information on methods of vitamin analysis for specific food, feed and pharmaceutical products; the means of improving vitamin methods from the standpoint of cost, simplicity and optimum correlation with the vitamin requirements of man, and a better interpretation of the significance of vitamin values, as determined by various methods.

This book is the outgrowth of all three purposes. It is an attempt to overcome the discrepancies that so often arise in vitamin analysis as the result of variations in methods. These discordant results may be introduced in the type of material, in sampling, in storage of the sample before assay, in extraction, in adjustment of the pH, or in any of the numerous mechanical manipulations. Reagents might also bring variations, as might the sequence or timing of operations, the kind of equipment, or even the temperature, humidity, or light intensity of the laboratory.

Only those methods that have been successfully applied to a variety of foods or other materials are included. With these, however, are listed the apparatus needed as well as the exact conditions at every stage.

AMA Pamphlets

PAMPHLETS published by the American Management Association, 330 W. 42nd St., New York 18, N. Y. From the Packaging Series:

No. 16. The Peacetime Application of Wartime Packaging Developments. Price, 75 cents.

No. 17. Modern Shipping and Materials Handling. Price 50 cents.

No. 18. Shipping Container Materials Testing. Price, 75 cents.

No. 19. The Packaging as a Selling Tool. Price, 75 cents.

No. 20. Progress Toward Safer Packing. Price, 75 cents.

From the Production Series:

No. 168. Cutting Tomorrow's Costs. Price, $1.

Sanitation

MILK AND FOOD SANITATION PRACTICE. By H. S. Adams. Published by The Commonwealth Fund, 41 E. 57th Street, New York 22, N. Y., 1947. 309 pages; 6½x9¾ in.; cloth. Price, $3.25.

An attempt has been made here to combine theory and practice in the field of milk and food sanitation. While the focus is that of the public health official, the book does discuss fundamental principles as well as what to do and how to do it.

It covers the sanitation problems of the milk plant specifically and the food plant generally. It ex-

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ROCCAL is a revolutionary, powerful germ killer that has many advantages over germicides now in general use.

ROCCAL IS POWERFUL! It kills bacteria almost instantly. Inhibits the growth of molds, slimes and algae.

ROCCAL IS SAFE! In recommended dilutions, ROCCAL is non-poisonous, virtually odorless and tasteless. Will not rust equipment, injure fabrics or irritate the skin.

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ROCCAL IS ACCEPTED by many leading public health authorities. More and more food packers and processors are now using ROCCAL

Put ROCCAL to work in your plant today and lick your sanitization problems.

Sample and literature on request

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WINTHROP CHEMICAL COMPANY INC.

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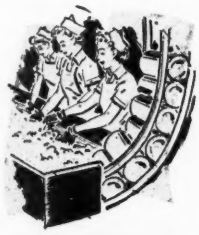

FOOD PROCESSING PLANTS

COLD STORAGE AND LOCKER PLANTS

FISHERIES AND FISH PACKERS

plains step by step how to plan and administer a milk control program. The potential hazards to sanitation all along the milk production line are pointed out, as are methods for recognizing and correcting faulty conditions.

Education as a means of achieving sanitation is stressed throughout the book and considerable space is devoted to the development of educational programs for milk and food handlers.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

WEIGHTS PER UNITED STATES GALLON AND WEIGHTS PER CUBIC FOOT OF SUGAR SOLUTIONS. By Carl F. Snyder and Lester D. Hammond. National Bureau of Standards, Circular C375. Price 10 cents.

BLUE MOLD DECAY OF DELICIOUS APPLES IN RELATION TO HANDLING PRACTICES. By Harley English, et al. Department of Agriculture, Circular 751. Price 10 cents.

REPORT OF THE ADMINISTRATOR OF AGRICULTURAL RESEARCH, 1946. Includes the reports of the several technical bureaus which form Agricultural Research Administration. Price 50 cents.

NUTRITION CHARTS. A set of 10 wall charts dealing with fundamental food needs, prepared by Bureau of Human Nutrition and Home Economics. Price, 75 cents per set.

AGRICULTURAL STATISTICS, 1946. Department of Agriculture. Price, $1.25. A compilation of farm, raw material, and food statistics gathered during the past year.

FOREIGN COMMERCE AND NAVIGATION OF THE UNITED STATES FOR THE CALENDAR YEAR 1944: Volume 1, Import and Export Statistics, Section A. Price, $4. Section B. Price, $2.25. Bureau of the Census. Cloth.

A GUIDE FOR THE PLACEMENT OF THE PHYSICALLY IMPAIRED. U. S. Civil Service Commission, Pamphlet 14, Fourth Edition. Price, 60 cents.

U. S. NAVY STRUCTURAL FIRE FIGHTING. Chief of Naval Operations Office. Price, $1.25. Cloth.

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Here's a "*Job-Rated*" truck . . . a truck that FITS the hauling job for which it was built!

It stands to reason that a truck that fits its owner's operating conditions will give better performance, better service to customers, and operate at lower cost.

You, too, can buy a truck that will fit *your* job . . . save *you* money!

You can get a "*Job-Rated*" truck powered with exactly the right one of 7 engines—plus the *right* gear ratio—to provide the pulling power you need, with the economy you want.

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You can be so sure of getting a money-saving, long-lasting truck like this, because Dodge builds 175 different "*Job-Rated*" chassis models.

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Your Dodge dealer is interested in your continued satisfaction: *First*, by selling you a truck that fits your job; *Second*, by giving you prompt, dependable Dodge truck service; *Third*, by providing you with factory-engineered truck parts that are identical with original Dodge "*Job-Rated*" truck parts.

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ONLY DODGE BUILDS "*Job-Rated*" TRUCKS

Fit the Job . . . Last Longer !

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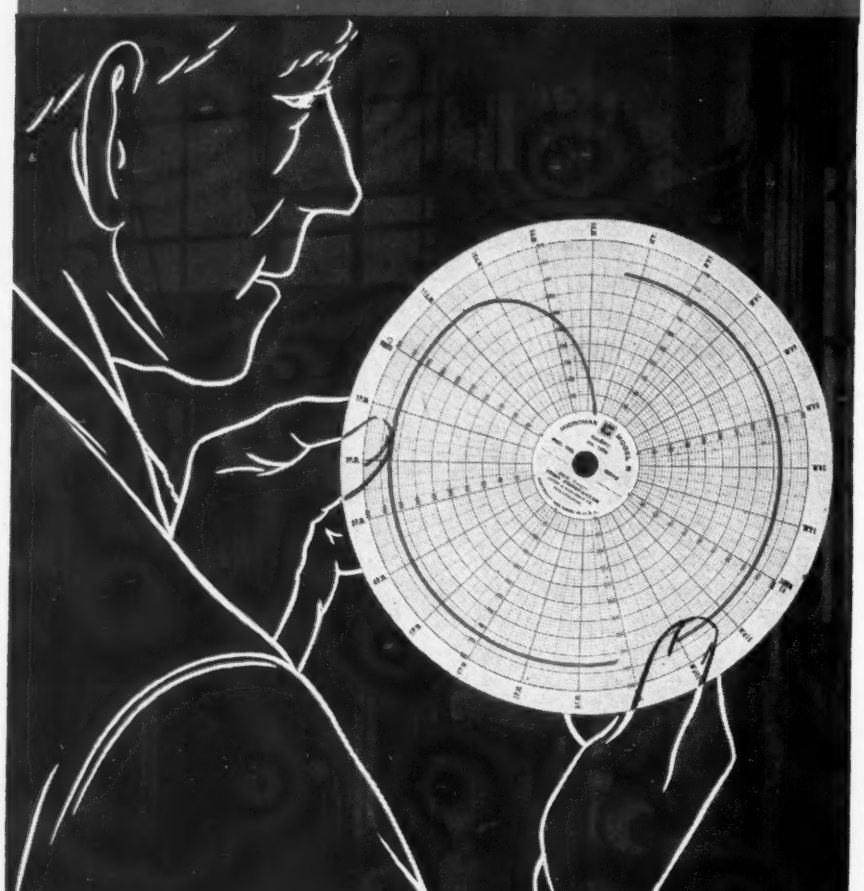
the high-temperature, low-pressure heat transfer medium



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In processing operations where temperature control is a vital problem—in the manufacture of plastic materials or the processing of certain food products for example—Dowtherm has more than proved its ability to provide the uniform, precisely controlled heat required. This is one of the many reasons which account for enthusiastic approval of Dowtherm installations by more than 600 users.

This dependable heat transfer medium, in addition to its outstanding advantage of accurate temperature control, incorporates other important features. Dowtherm operates at lower pressures resulting in saving of both man hours and material—temperatures ranging as high as 700° F. involve a corresponding pressure of only 88 lb./sq. in. And Dowtherm heating systems make possible greater operating efficiency and reduced maintenance costs.

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CHEMICAL COMMENTS

Dichloro (Phenyl Ether) Stops Attacks of Ambrosia Beetle in Green Lumber

Chemical control of Ambrosia (pinhole) Beetles is offered by Dichloro (Phenyl Ether). Attacks by the beetles, which bore into green timber and freshly sawed lumber of many hardwoods, are stopped by the chemical, and prolonged protection is given. An oil solution or a water emulsion may be applied to the freshly cut lumber with any type of hand or mechanically operated pressure sprayer. Since Dichloro (Phenyl Ether) mixes readily with inexpensive light oils of the kerosene range, and presents no handling difficulties, treating solutions are easily prepared locally.

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Penetration of printing ink is minimized by a light coating of Methocel, and the gloss and brightness of inks or varnishes subsequently applied is noticeably improved. Applied as a surface sizing at the water boxes of the calender stack, Methocel deposits a film possessing a high degree of adherence to paper or paperboard. And, on waxing stock, a light prime coat of Methocel greatly reduces the penetration of paraffin, and maintains the opacity and whiteness of the original stock.

Coating Fabrics for Chemical Resistance

Saran F-122 Latex, a new Dow material for the textile industry, is used as a coating, impregnating and laminating agent in the treatment of fabrics. Coated with Saran Latex, fabrics are particularly well-suited for industrial use where chemical and abrasion resistance and durability are important. They are made resistant to water, oils, greases, gasoline, and acids in the making of protective clothing, tarpaulins and other products. Yarn and thread can also be coated with Saran Latex, making them waterproof and resistant to picking and linting.

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PATENTS

Sucrose Solution Freed from Glucose and Other Impurities by Treatment with Divalent Alkaline Defecating Agent, Filtering to Remove Precipitate, Subsequent Treatment with Acid Defecating Agent and Refiltering to Give Clear Liquid—Arvid M. Erickson, San Jose, and John D. Ryan, Campbell, Calif., to Barron-Gray Packing Co., San Jose, Calif. No. 2,416,682. March 4, 1947.

Glycerine Made by Yeast Fermentation of Slightly Acid Sugar Solution in Presence of Ammonium Sulfite and Ammonium Bisulfite—Ellis I. Fulmer and Leland A. Underkofler, Ames, Iowa, and Richard J. Hickey, Terre Haute, Ind., to Iowa State College Research Foundation, Ames, Iowa. No. 2,416,745. March 4, 1947.

D-Tartaric Acid Synthesized Using Vanadium Catalyst—William Edward Barch, Freeport, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,417,230. March 11, 1947.

Ice Cream Texture Improved and Overrun Controlled by Addition of Small Percentage of Ester of the Polyhydric Alcohol and Higher Fatty Acid to Mix—Warren D. Roth, Leo C. Brown and Guy W. Phelps, to Industrial Patents Corp., Chicago, Ill. Reissue No. 22,858. March 25, 1947.

Bacteria and Mold Growth on Meat Inhibited by Use of Non-Toxic, Water Soluble Acetate Salt Containing Combined but Undissociated Acetic Acid—Hans F. Bauer and Elmer F. Glabe, Chicago, Ill., to Stein, Hall & Co., Inc. No. 2,417,806. March 25, 1947.

Eggs Moved Along Longitudinal Track by Action of Two Parallel, Wide-Threaded, Oppositely Rotating Screws Beveled to Conform Generally to Shape of Normal Egg—George F. Hodson, Altus, Okla., and Lyman L. Campbell, Riverdale, Ill., to Wilson & Co., Inc. No. 2,417,823. March 25, 1947.

Poultry Decapitated by Foot-Operated Reciprocatory Blade—Jacob L. Staufenbiel, Affton, Mo. No. 2,417,890. March 25, 1947.

Potatoes Treated with Water Solution of Alkali Metal Hypochlorite and Washed with Water Solution of Antichlor to Prolong Storage Life—Arthur F. Kalmar, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,417,932. March 25, 1947.

Potatoes Freed from Black Scurf by Detergent Action of Solution of Alkali-Forming Metal Hypochlorite and Mechanical Brushing in Presence of Reducing Agent to Neutralize Hypochlorite Solution Remaining on Potatoes—Arthur F. Kalmar, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,417,933. March 25, 1947.

Starch Slurry Containing from 5 to 30 Percent Solids Gelatinized While Pumping Repeatedly Under Pressure Through Restricted Orifice—George V. Caesar, Staten Island, N. Y., and Thomas D. Thompson, North Branch, N. J., to Stein, Hall & Co., Inc., New York, N. Y. No. 2,417,969. March 25, 1947.

Frozen Confection Bars Coated by Dipping in Tank Equipped With Float Device to Hold Bars at Predetermined Depth in Coating Material—Leo D. Overland, Brooklyn, N. Y. No. 2,418,190. April 1, 1947.

Coffee and Like Roasted Under Thermostatically Controlled Conditions—Richard F. O'Toole, Scarsdale and Alexander C. Parlini, Freeport, N. Y.; one-half to O'Toole, one-fourth to Nicholas J. Vezeris and one-fourth to Spiro Linakis, New York, N. Y. No. 2,418,275. April 1, 1947.

Bread Mechanically Wrapped in Progressive Steps to Give End Folds—Charles H. Petskeyes, Davenport, Iowa to Gellman Manufacturing Co., Rock Island, Ill.. Nos. 2,418,276 and 2,418,277. April 1, 1947.

Milk Pre-Cooled in Shipping or Handling Container—Ralph M. McDade, Mebane, N. C. No. 2,418,310. April 1, 1947.

Citrus Waste Converted Into Non-Bitter Edible Food Products—Daniel Boscawen Vincent, Tampa, Fla. Reissue No. 22,865. April 8, 1947.

Vegetables and Like Blanched in Continuous Manner in Unit Equipped With Endless Inclined Conveyor, Circulating System for Blanching Medium, and Means for Removing Sediment—Freeman M. McBeth, Harrisburg, Pa. No. 2,418,519. April 8, 1947.

Sugar Beet Root and Fruit Materials Combined to Give Candied Fruit Composition With Less Than 20 Percent Moisture and Without Crystallization of Sucrose Content—William Schloessinger and Alexander M. Zenzes, New York, N. Y. No. 2,418,558. April 8, 1947.

Starch Recovered From Wheat Flour Dough by Making Into Slurry, Gravity Concentration and Centrifugal Separation—Robert W. Callaghan and Richard H. Schilling, Minneapolis, Minn., to General Mills, Inc. No. 2,418,621. April 8, 1947.

Foods Quick-Frozen by Direct Contact With Polyphase Refrigerant Containing Sugar as Freezing-Point Depressant—Luis H. Bartlett, to Texas Research Corp., Austin, Tex. No. 2,418,745. April 8, 1947.

Foods Quick-Frozen During Transfer Through Refrigerating Medium by Means of Helical Screw Conveyor—Luis H. Bartlett, Willis R. Woolrich and Howard E. Brown, to Texas Research Corp., Austin, Tex. No. 2,418,746. April 8, 1947.

Imagine You

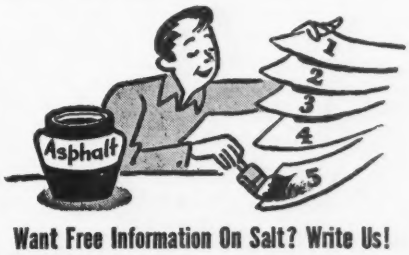
WEARING AN ASPHALT RAINCOAT!

● Probably you'd look terrible. But one thing is sure —you'd stay *dry!* For asphalt keeps out moisture. And that's why we use asphalt to help keep Diamond Crystal Salt dry, and prevent caking.

Salt usually cakes in excessive humidity, because moisture condenses on salt particles, forming a thin layer of brine. Then, in dry weather, the brine evaporates and the crystals knit together.

Our research laboratory has found a number of ways to help prevent salt caking. Removal of moisture-attracting impurities, such as calcium chloride, helps. So does complete removal of fines by careful screening. Most important is to provide salt with a moisture- and vapor-resistant package.

Take our Flour Salt bag, for example. It is composed of three 50-lb. and two 25-lb. sheets of kraft, laminated together with 40 lbs. of asphalt per ream. That's a lot of asphalt, and it costs us more money—but our moisture-vapor transmission tests show this bag is worth the extra cost. The bag is even sewn with *waxed thread* to seal the holes made by the sewing-machine needle. That's real *protection*—one reason we have been able to eliminate caking as a major problem!



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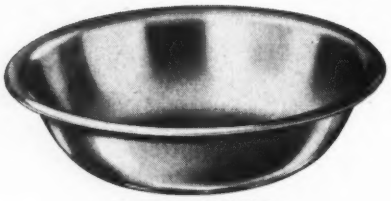
TERRISS SEAMLESS STAINLESS STEELWARE

2½ QT. PAN

2 OZ. MEASURING CUP

COVERED 9 OZ. JAR



5 QT. BASIN

4 QT. PITCHER

This Stainless Steelware is completely sanitary. There are no seams or crevices to catch dirt or leak. Polished inside and outside.

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Vitamin A Shortage? The Answer Is . . .

CAROTENE

Scarcity of Sharks Cuts Vitamin Supply

WASHINGTON, Jan. 18. (AP) James M. Lemon, chief of the technical branch of the Fish and Wildlife Service, said today a scarcity of sharks is threatening the nation's supply of vitamin A. "The truth is," Lemon told a reporter, "our sources of supply for vitamin A are drying up—and this is a vitamin that has not yet successfully been synthesized."

ENRICHES AS IT COLORS

In addition to its Vitamin A activity, Carotene imparts the rich, natural color found in butter and carrots. It gives sales appeal to your product.

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Carotene has no fishy odor or taste. Potencies up to 1,350,000 units per gram.

NEW LOW PRICES

Write For FREE TESTING SAMPLES

BARNETT LABORATORIES
6256 Cherry Avenue Long Beach 5, California

IFT Homecoming

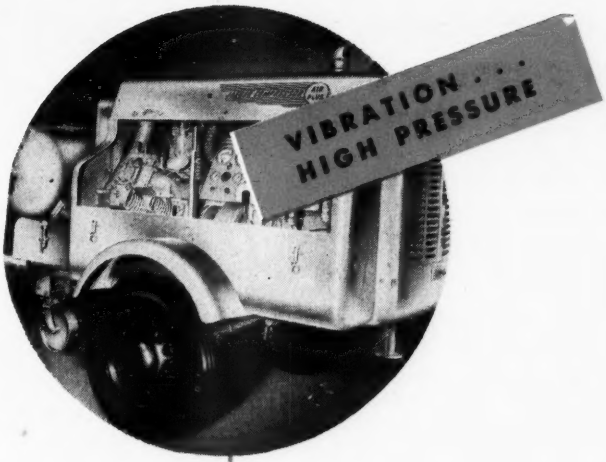
(*Continued from page* 92)

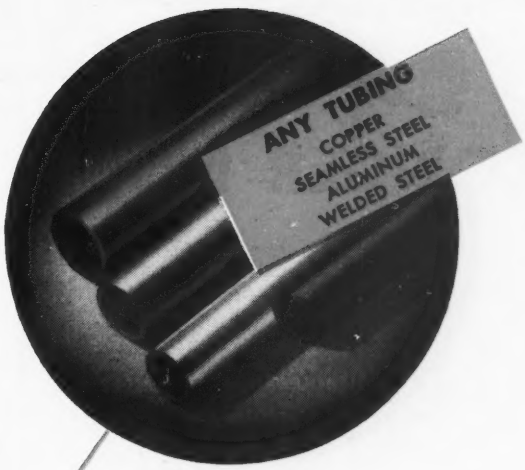
dipped in brine and sodium benzoate, then packed in crushed ice, keep without spoiling for 15 days.

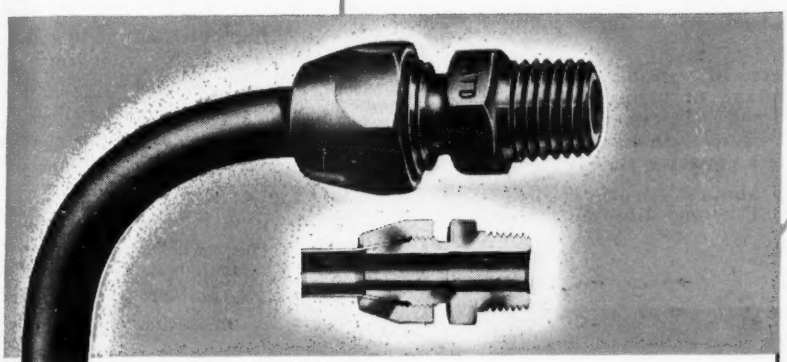
C. R. Fellers, Massachusetts State College, Amherst, told of the great effort that has been made to discover suitable, rapid and foolproof tests for evaluating the condition of fresh and preserved fish. Determination of total volatile bases and trimethylamine offer the most reliable indications of the condition of fish. While organoleptic tests are reasonably satisfactory, and are still the best, they are in need of laboratory confirmation. He added that this was a fertile field for investigation. Other decomposition tests that have been studied include: surface pH, buffer capacity, ammonia, tyrosin, indol, carbon dioxide, penetrometer, total bacteria count, hydrogen sulfide, free fatty acid and oil rancidity. Few of them, however, have been found to be of value in industry. Tests have also indicated, he said, that frozen fish, with few bacteria, will spoil faster upon defrosting than fresh fish with a greater number of bacteria.

One of the latest developments in the fish industry is that of freezing fresh, ocean caught fish aboard ship. N. D. Jarvis and H. W. Nilson, division of commercial fisheries, Fish and Wildlife Service, said that the vessels used are combination trawlers and processing plants, equipped to quick freeze and can crabs and fish. The fishing industry, they reported, is developing new products, which will minimize the handling necessary for cooking at home. Among these are many precooked quick frozen items. Labor's resistance to the increasing use of mechanics was indicated as a short sighted retarding factor. It was suggested that labor and management give more consideration to the long range economic possibilities.

Synthetic egg white, protein hydrolysates, agars, alginic acids and fish oils used in place of olive or cottonseed oils for packing sardines were listed as among the valuable fish byproducts, by H. L. A. Tarr, Pacific Fisheries Experiment Station, Vancouver, B. C. He also listed chemicals useful in medicine that are obtainable from fish. Among these are various proteins, insulin, protamine, and the antipernicious anemia factor. Enzymes can be prepared for softening hides







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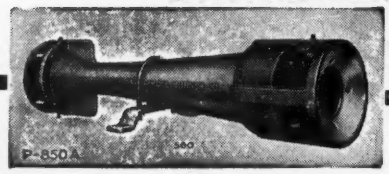

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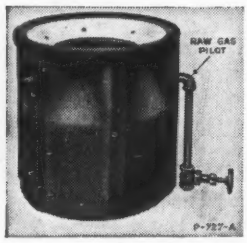

Raw gas pilot, an integral part of nozzles in sizes 4", 5", 6" and 8".

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for leather and livestock feed can be developed from the proteins recovered from liquor left after cooking and processing fish.

Special Problems

J. J. R. Bristow, Juice Industries, Inc., Dunedin, Fla., acted as chairman of the third Wednesday morning session, devoted to special problems.

Practical solutions to difficult problems in packaging foodstuffs were described by Dr. Louis C. Barail of the Bacteriological Dept. of the United States Testing Co., Hoboken, N. J. He defined a good food packaging material as one which is germ and mold-free, fungistatic and bacteriostatic, insect and rodent repellent, non-toxic, germicidal and fungicidal and non-irritating to the skin. He then compared the properties of several packaging materials now used with this ideal standard.

Steam sterilization, often used for sterilizing paper and cardboard containers, he stated, is an expensive method of sterilization and is ineffective once the container is opened. Antibiotics and some chemical compounds have been successfully incorporated into most packaging coatings. The antibiotics are unstable and expensive. The long chain organic mercury compounds can be applied to the inside as well as the outside of a container and in concentration ranges from 1:1000 to 1:5000 will inhibit and oftentimes kill bacteria or fungi. They are suitable, he said, for dry packaged material and might even be used for moist materials.

For repelling insects, Dr. Barail recommended the use of DDT in concentrations from 0.75 to 5 percent. The opportunity for research in the study of rodent repellents was stressed, for with an annual damage in this country exceeding the million dollar mark, Dr. Barail said we still do not have a single chemical that is a foolproof rodent repellent for protective food packaging. He suggested that plastics of the Vyncote type are today closest to the ideal packaging material.

New soybean products that whip more rapidly and to a greater volume than either gelatin or egg white, were discussed by Dr. Ralph M. Bohn, Archer Daniels Midland Co., Minneapolis. Soybeans are converted into foam-producing agents by extracting the oil from the flaked or ground bean and by partial hydrolysis and drying of the remaining soy grit. Comparative analyses of soy albumin, egg albumin and gelatin were presented and

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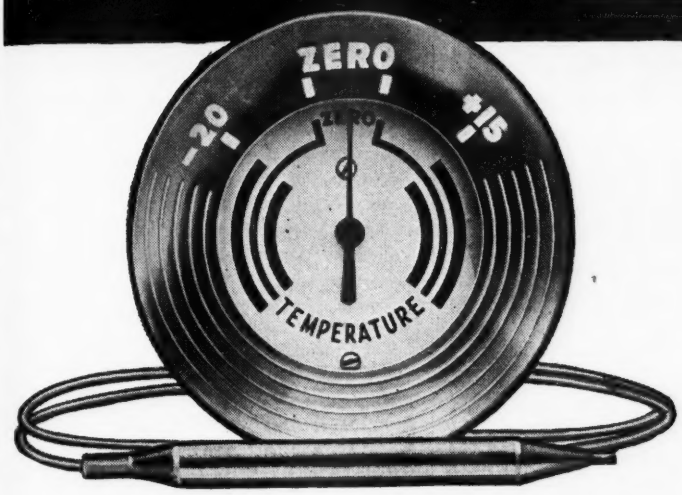

THE obvious protection of Auto-Lite Indicating Thermometers is assurance of most complete service from your zero-holding cabinets. These precision-made instruments are a basic part of the storage unit . . . for freezing, cold-holding and dispensing cabinets. Send now for full information on Auto-Lite Thermometers.

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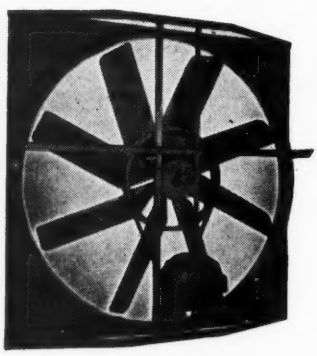

Coolair paves the way for accelerated production in your plant . . . and bigger profits! Plenty of fresh, stimulating air, moving fast enough to create a *cooling breeze*, will assure you of peak production from all of your employees.

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figures showed that in the processing of such confectionery and bakery products as mazetta, frappe, marshmallow and meringue, protein whipping agents from soy were markedly advantageous. These foam-producing materials open up new fields and Dr. Bohn predicted further developments.

Vacuum-concentrated, frozen orange juice was reported to retain its ascorbic acid content, with but minute loss even after a year of storage, when kept at temperatures ranging from zero to 40 degrees F., according to R. H. Cotton of the National Research Corp., Boston.

These findings were made at the Vacuum Foods Corp. in Plymouth, Fla., and were studied by W. R. Roy of that company, R. H. Cotton, C. M. Brokaw, O. R. McDuff and A. L. Schroeder of the National Research Corp. of Boston.

The citrus material studied was concentrated by boiling off water at low temperature in a vacuum and then diluting the concentrate slightly with fresh juice before freezing.

The use of yeast for the removal of sugar from raw eggs before drying was reported by J. C. Ayers, Y. H. Yare, W. S. Ogilvy and G. F. Stewart, bacteriology section, Iowa Agricultural Experiment Station, Ames. It was reported that yeast acts only if yeast extract is also added to the mixture. By controlling the fermentation, mucin can be retained. Bacteria other than yeast so far used to remove the sugar have resulted in objectionable flavors and odors. Results of large scale trials, it was said, indicate that this yeast method has commercial possibilities in removing the sugar, which causes deterioration of the egg whites in storage.

Methods for determining the ripeness and color of canned peaches and apricots were described by Amihud Kramer, University of Maryland and H. R. Smith, National Canners' Association. In one case the measurements were made with the use of a spectrophotometer and in the other through measurement of fluorescence.

1948 Meeting

Philadelphia was announced as the choice for the 1948 conference, which will be held June 6-9. The program committee, under the chairmanship of Paul Logue, Monsanto Chemical Company, St. Louis, has already selected a theme for next year's meeting. The 1948 gathering will be novel in a number of ways, president-elect Hucker promises.

This Screen and Filter Cloth really stops trouble

Any filter or screen element stays on the job longer when it's made of Monel*, Nickel or Inconel*.

For these are the "task metals" of industry.

Compare them with any fabric or metal cloth that is causing you trouble now. Wire cloth of these metals is rustless . . . corrosion resistant . . . strong . . . tough. It endures high temperatures. It stands abrasive wear.

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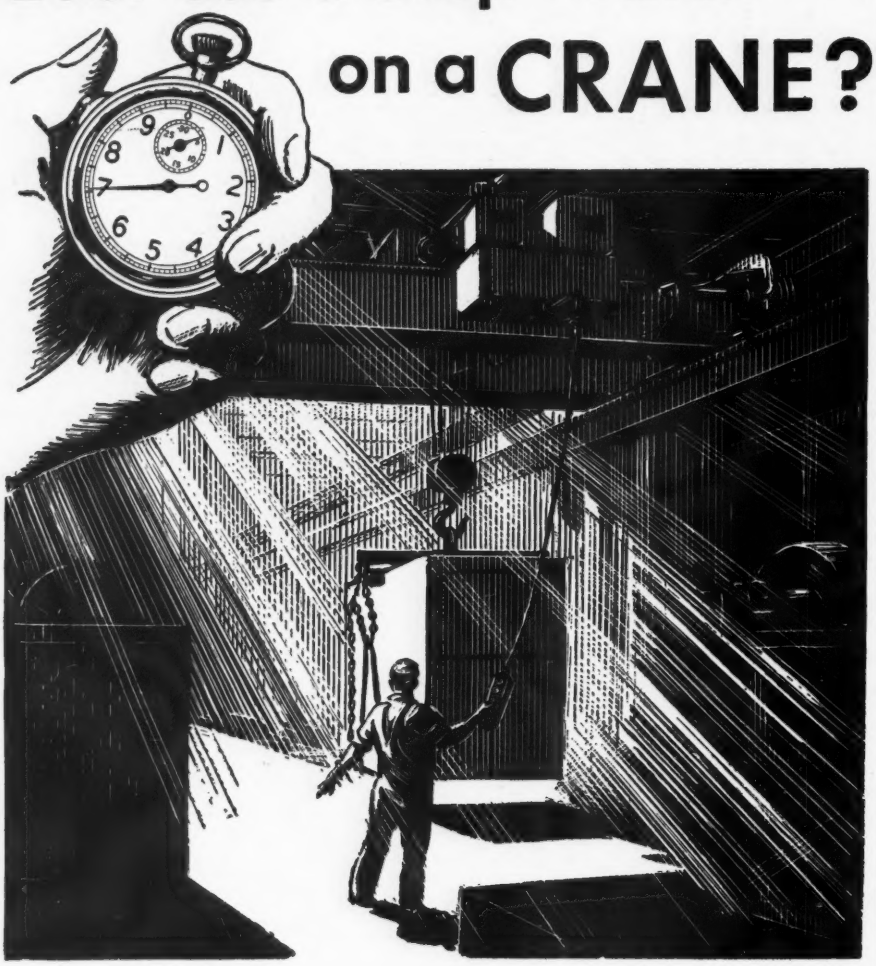
"Task Metals" for Industry

Ever use a Stop Watch on a CRANE?



It isn't necessary to work in fractions of a second but it will pay you to check the time it takes to move heavy materials from one spot to another. No matter how efficient you are in operations involving manufacturing, processing or fabricating, there's bound to be a waste of time, money and manpower unless your handling costs are kept down.

Let trained, experienced Shepard Niles engineers assist you in making a study of your handling problems. Over a period of many years America's oldest builder of electric cranes and hoists has assembled data on the handling of materials in thousands of businesses. All this experience is available to you, without obligation, to help you select the crane best suited to do your job with ease, economy and efficiency.

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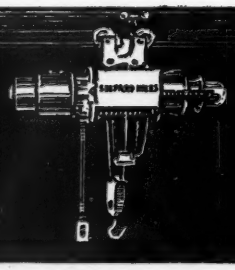

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Warehousing Nuts

(*Continued from page* 97)

load of nuts would require at least two men over a considerable period of time. The unit load, palletized, requires one man and a fork-lift truck to handle a 5,000-lb. load.

2. In shifting unit loads in the warehouse (30 percent of all warehouse trucking), the fork-lift truck handles in a given time about three times the number of loads that could be moved with hand trucks.

3. Transportation and tiering of loads is performed in one operation with a fork-lift truck. One man can pile, or unpile, more sacks of nuts in a given time with a lift truck, than a gang of manual workers can.

4. Congestion from a large number of hand trucks during peak season is avoided through the use of fork-lift trucks.

5. Handling equipment does not give off objectionable fumes likely to be absorbed by the nuts.

6. Amount of shell breakage is reduced since handling operations are held to a minimum.

—*End*—

New Reefer Car

(*Continued from page* 82)

temperatures ranged from about –4 deg. F. to nearly 1 deg. F. Bottom commodity temperatures ranged from about –3 deg. F. to about 3 deg. F. At the time of unloading at Jersey City, N. J., after completion of the test, cartons of tangerine segments were hard frozen.

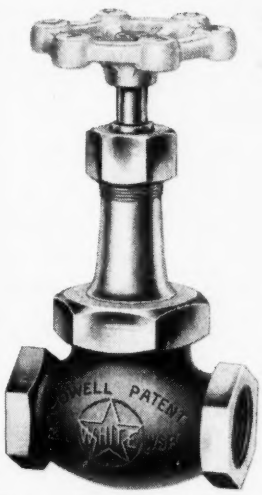
"Air temperatures in the car at the top of the load remained below 10 deg. F. for the entire test period. Temperatures at the bottom of the load were a few degrees higher, but they were lower than 10 deg. F.

"Improved wall and floor racks, allowing a freer circulation of air, would undoubtedly narrow the spread between temperatures at the top of the load and those at the bottom of the load.

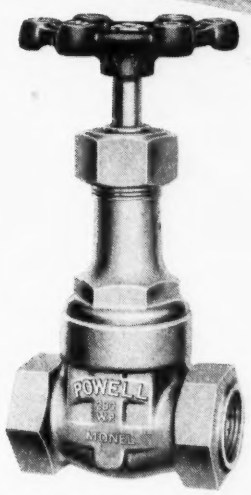
"Average and extreme commodity temperatures at the top of the load remained below or only slightly above 0 deg. F. throughout the test, except for one day. Even then the average for the day was close to 0 deg. F.

"Owing to the position of the cooling coils at the ceiling of the car, the colder temperature occurred at the top of the load. Average commodity temperatures at the bottom of the load, however, ranged from about –2 deg. F. to about 3

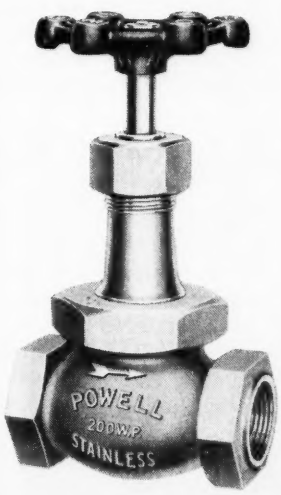
They may look alike, but...
one is a winner..another an "also-ran"



200-pound Bronze Globe Valve. Screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear resisting "Powellium" nickel-bronze disc.



Monel Metal* Gate Valve. 200 pounds W. P. Has screwed ends, screwed-in bonnet and inside screw rising stem.



200-pound Stainless Steel Globe Valve with screwed ends and union bonnet.

Pure Nickel O. S. & Y. "Y" Valve. 150 pounds W. P. Has flanged ends and bolted flanged bonnet.

Call it "heart", "staying power", or what you will, some thoroughbreds have what it takes to win.

Now let's consider valves!

Compare the outward appearance of any Powell valve with that of other valves of the same type and size. You'll probably see very little difference. *It's the things you don't see that give Powell valves the "staying power" that makes them winners.*

There's nothing mysterious about these things. They're merely the result of the continual progress in design, knowledge of materials, and quality of workmanship that comes from more than a century of making valves—and valves only—for American industry.

For the last 25 years, to meet the ever-growing demands of the Chemical and Process Industries, Powell has been building a complete line of Corrosion-Resistant Valves in many special designs and the widest range of pure metals and alloys ever used in making valves.

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Scripts and recordings for radio programs must get there in a hurry. This is one reason why stations, networks and agencies are big users of Air Express. Here's where *speed pays.*

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Speed pays in your business, too!

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deg. F. At no time was the commodity temperature at any position in the bottom layer higher than 10 deg. F.

"The refrigeration system maintained commodity and air temperatures near 0 deg. F. without significant rise when the car was moved from an outdoor temperature of approximately 28 deg. F. into a test house temperature of approximately 92 deg. F.

"The rate of ammonia consumption during the 10 days while the car was in the test house averaged 41.98 lb. per hr. During one 46-hour period of the test, the ammonia-consumption rate averaged 45.45 lb. per hr.

"When the car was opened for unloading in Jersey City, N. J., a light coating of flaky frost was found on the cooling coils. No ice was formed on the coils."

—End—

Trademark

(*Continued from page* 108)

in which no exclusive claims may be asserted."

There are many similarities of the provisions of the marks registerable upon the Supplemental Register, and those under the 1920 Act. Like the 1920 Act, trademarks applied for under the Supplemental Register are not published in the Official Gazette before registration, and are not subject to opposition. They are, however, subject to cancellation at any time after registration by anyone who believes he would be damaged by this registration.

It should be noted that a mark on the Supplemental Register, or registered under the 1920 Act, which has "become distinctive of applicant's goods, or services in commerce" as by substantial exclusion and continuous use for five years, may be registered on the Principal Register. A mark registered under the 1920 Act was never later registerable under the 1905 Act.

Every owner of U. S. registered marks should review his complete trademark panorama. If he desires his marks under the 1905 Act to acquire the status of incontestability (approximate) they must be re-registered; but anytime within 5 years thereafter they will be subject to cancellation by anyone who feels he is damaged. If he does not care about that status he automatically gains all the other benefits of

hand them a *Smart Line!*

You give your women workers a real "lift", when you put them in uniforms as smart-looking as these Hattie Snow Princess dresses. They have a real custom-tailored look that fits and flatters most figures. Keep hands busy at the job instead of hiking skirts or periodic primping. Amazing how so simple and inexpensive a service can boost both morale and output, and reduce turnover!

WITH ALL THESE IMPORTANT HATTIE SNOW FEATURES:

- ***SAFE*** *– no strings, tabs or loose ends to catch on machinery or equipment*
- ***SANFORIZED SHRUNK MATERIALS*** *for permanent perfect fit*
- ***BAR TACKED*** *(sturdy supporting stitching) at all points of stress*
- ***RUGGED, LONG-WEARING MATERIALS***
- ***DOUBLE STITCHED SEAMS***

STYLED BY A WOMAN TO MEET A WOMAN'S NEEDS

#308
PRINCESS—BUTTON FRONT

- *One upper left pocket*
- *Two lower pockets*
- *Short puffed sleeves*
- *Unattached belt*

FOR BETTER WORK WEAR

HATTIE SNOW UNIFORMS PAT. OFF. REG. U.S.

 # 307
PRINCESS DRESS

- *Zipper front*
- *Peter Pan collar*
- *Lower right and upper left pockets*
- *Short puffed sleeves*
- *Unattached belt*

Send for Style File Catalog No. 110 and prices.

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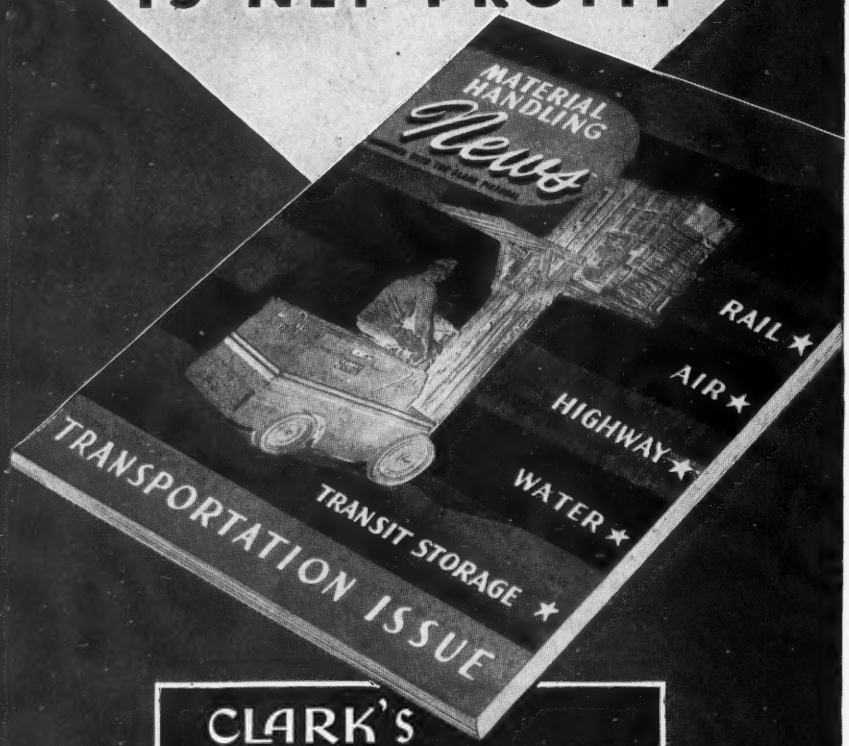

CLARK'S MODERN METHODS AND MACHINES AS PRESENTED IN THIS NEW ISSUE OF "MATERIAL HANDLING NEWS" WILL HELP YOU TO ACHIEVE YOUR AIM

CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
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Please send me a copy of the Transportation Issue of "Material Handling News."

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this new law anyway but must renew the marks before expiration. Because a holder under the 1920 Act will have no federal registration after the expiration of his marks, he should re-register his marks upon the principal register if they can qualify; and this should be scrutinized. If not, they can either be re-registered upon the supplemental register, which offers much less protection indeed, or abandoned.

Every owner of an unregistered mark which is applied to goods or services, at least some of which is in interstate commerce, should consider the matter of registration under the new law.

—End—

Odors in Egg Storage

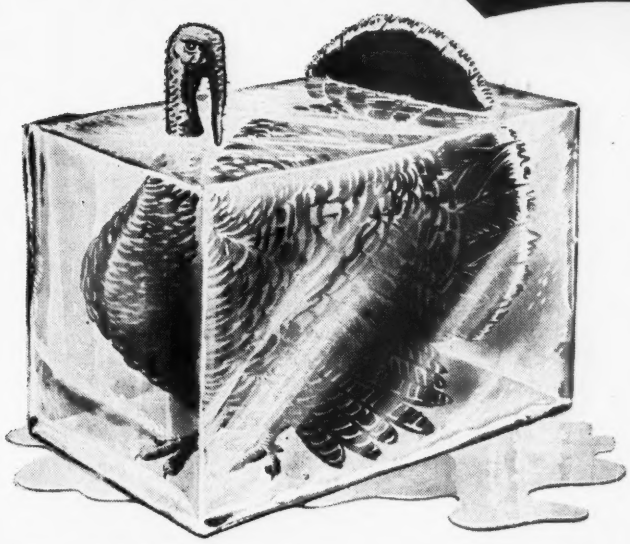
(*Continued from page* 95)

course, been known for a long time. It has been shown that activated carbon could absorb the oxidizable volatiles arising from such molds. This does not mean that the method of controlling the odor problem from moldy eggs lies in air purification with activated carbon. The real approach to the mold odor problem would be through plant sanitation and the proper control of humidity. This study has not investigated the possible role that ozone may play in controlling a mold odor problem in egg storage through its control of surface molds. Ozone may serve a real function from the odor control standpoint in this regard.

This study has indicated that used container-materials may be a real source of contaminating odors. This was true even though there were no visible molds growing on the materials at the end of the storage period. What these odors may be is not known.

It has been shown that mineral oil treated eggs did not seem to have as much "storage odor" as untreated eggs. This effect was not as striking as that obtained with air purification with activated carbon. However, the oil treatment is used for reasons other than prevention of odor absorption. In other words, these results suggest that oil dipping may have some further justification than lengthening the storage life of the eggs.

Results with oiling as related to odor absorption should not be regarded as more than suggestive in the view of other work. Sharp, Stewart, and Huttar[3] reported that the relative absorption of flavors by



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TURKEY FREEZERS face a "peak" season in the Fall. Fruit, vegetable, and fish freezers face much the same problem. They all need more refrigeration capacity in some seasons than others.

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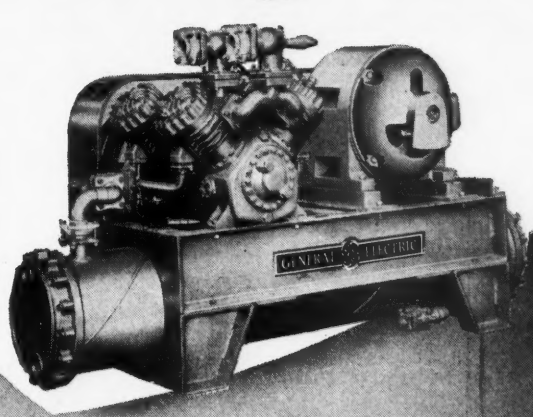

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oiled and unoiled eggs depends upon the properties of the volatile substance in relation to its solubility in the oil. They felt that in some situations oiling might either increase or decrease flavor contamination.

The use of ozone did not seem to remove the volatiles evolved by case materials. The possible role that ozone may play in preventing odor contamination in egg storage by controlling mold growth has been indicated above.

Air purification with activated carbon cut down the oxidizable volatiles and markedly reduced the odor level in eggs. It should, however, be noted in this connection that high volatile levels were not experienced in Experiment III. The investigation suggests that large scale air purification experiments should be tried in egg storage to reduce the commonly experienced "flat" or "storage odor" in eggs.

References

1. Anon. Eggs and Egg Products. U.S.D.A. Circ. 53, 1941
2. C. R. Gross and R. M. Smock. Studies on Odor Elimination in Apple Storage. *Refrig. Eng.*, 50, 535-540, 1945.
3. P. F. Sharp, G. F. Stewart and J. C. Huttar. Effect of Packing Materials on the Flavor of Storage Eggs. Cornell Univ. Agr. Expt. Sta. Bul., 189, 1936.

—End—

Packaging Laboratory

(*Continued from page* 101)

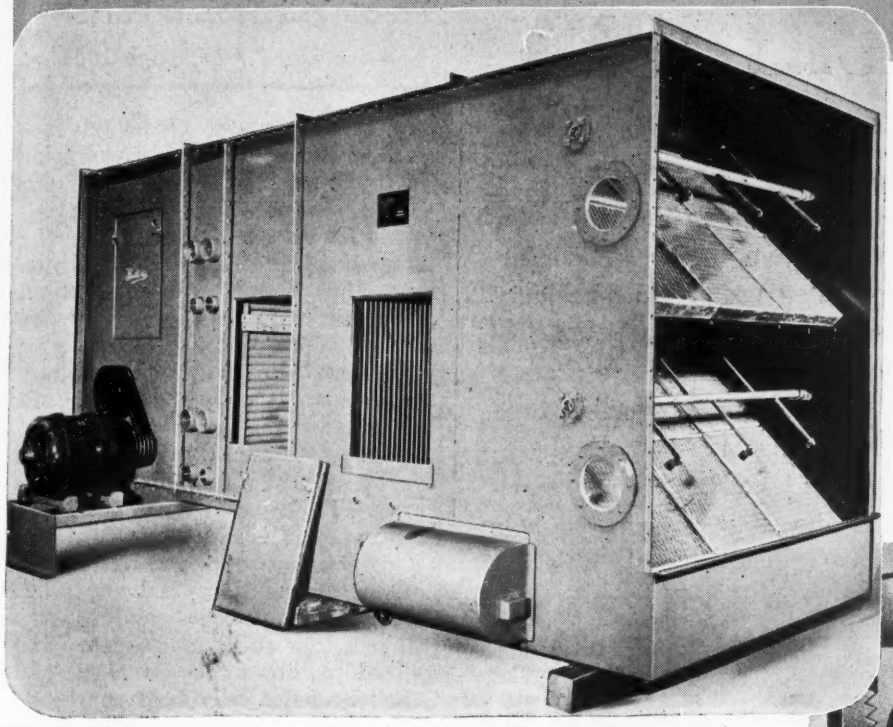
trouble in retail stores as the company's products. Company and competitive products are picked up periodically and tested by the laboratory. In this way the laboratory determines whose product is superior. If the company's products are inferior, then need for better packaging may be indicated.

Working With Purchasing

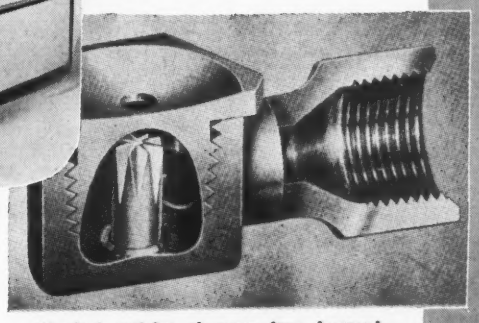
The purchasing department wants to know if packaging materials meet specifications. It is familiar with suppliers and the date, quantity and shipment of packaging materials. Consequently, it draws spot check samples. These are tested by the routine control laboratory.

Samples of suppliers' materials, including new packaging materials, are received by the purchasing department. These samples, accompanied by a letter with claims and specifications, are submitted to the packaging laboratory to determine if such materials can be used in regular or contemplated operations. The laboratory makes whatever tests are necessary to determine if

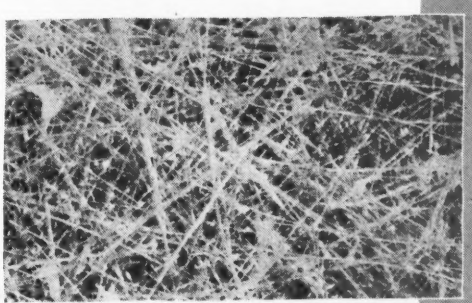
CLEAN AIR *with* HUMIDITY *and* TEMPERATURE CONTROL *at* MODERATE COST!



"Buffalo" Wet Glass Cell Air Washer, showing spray banks and filter packs at front. ....



Atomized curtains of spray from improved "Buffalo" nozzles such as the above, "bathe" the passing air constantly and thoroughly.



The "heart" of a "Buffalo" Wet Glass Cell air cleaning process is this fine, closely intermeshed glass fibre which "scrubs" off the dirt as the air passes through.

Here's triple-process air conditioning for product quality control as well as health, comfort and efficiency in your personnel!

"Buffalo" Wet Glass Cell Air Washers do this to your air:

(1) Remove 98.5% of the visible dust, dirt and other air-born impurities.

(2) Humidify your air to the exact degree you require—and hold humidity at that point.

(3) Heat to desired temperature, by efficient heating coils through which air passes.

(4) Cool—by means of chilled water, in sprays or by means of cooling coils.

—at moderate cost! "Buffalo" Wet Glass Cell Air Washers are not difficult to install, and fan and pump power requirements are low.

WRITE FOR BULLETIN 3457. It gives you facts to help you choose the most economical, effective unit for your particular need.

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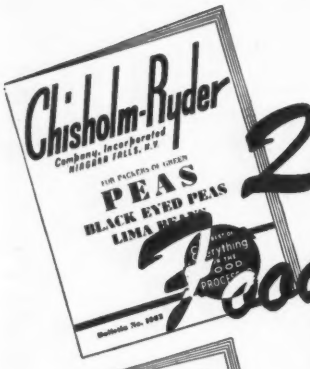
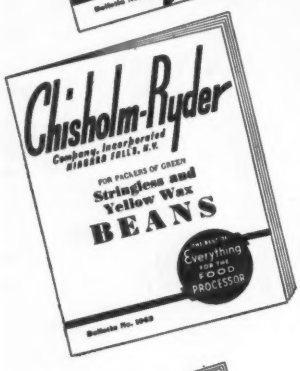
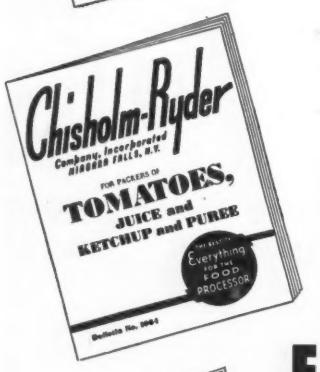
"Buffalo"

WET GLASS CELL AIR WASHERS







Quality Food Processing Machinery

If you are packing Vegetables, Fruits or Juices, send for the new Chisholm-Ryder Catalog which contains complete information regarding processing machinery for Green Peas, Stringless Beans, Tomatoes, Juices, etc., as well as production line charts, processing tables and warehouse equipment. Our Engineering Department is ready, through recommendations and plant layouts, to help you produce a quality pack with low labor costs.

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THE BEST OF Everything

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Niagara Falls, New York
FOR THE FOOD PROCESSOR

49

the claims are justified and if the material meets the specifications submitted. In addition, company operations are reviewed to determine if the material has a place in the operations and where it can be used to an advantage. The laboratory then issues a report to the purchasing and production departments, recommending use or non-use of the material.

—End—

Precooked Frozen Food

(*Continued from page* 106)

an optimum sugar content to assure a constant golden-brown color in the final cooked product. If the sugar content is too high, the product will be too dark. If, on the other hand, the sugar content is too low, the product will lack color. When the potatoes do not have the correct sugar content, they must be stored at 70 to 75 deg. F. to reduce sugar content, or held at 36 deg. F. to increase the sugar content.

The potatoes are then to be steam-peeled, hand-trimmed and eyed. Each potato must be examined, and where necessary, eyes must be cut out and remaining skins or sunburn trimmed off. Next, the peeled potatoes are flumed to a slicer and sliced. The sliced potatoes are washed and then blanched to retard enzymatic spoilage in temporary storage and discoloration before frying. Frequent inspection of sliced potatoes must be made while they are being taken from blancher to fryer to eliminate defects from hollow heart, mahogany rot, or poor cuts.

Finally the potatoes are fried. Instruments on the fryer control the temperature of the cooking fat and the speed of conveyor belt. Special filters and a centrifuge keep the fat clear. The cooked product must be checked for color with a color chart. If the product meets the color standard, it is then frozen in a blast freezer tunnel, packed and stored. Samples representing each code date must be stored for taste testing and future reference.

Product rancidification has been eliminated chiefly by the use of only hydrogenated vegetable shortening. Daily chemical analyses are made to determine the possible development of incipient rancidity.

Educating Employees

To maintain a sanitary plant and a smooth flow of wholesome products, employees must be educated on the significance of proper food

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handling. In addition to instruction on well-recognized sanitary measures, emphasis must be made against infecting foods with pathogenic organisms from cuts, boils, blisters, and sores. Penalties must not be imposed on employees who voluntarily report cuts or infections. They should be assigned to other tasks where they are not in contact with food.

Sterilization

Precooked frozen food producers are constantly seeking new methods of safeguarding their products. A method for sterilizing the product in its final package is most urgently needed. Electronic sterilization may be the solution. Considering the intensity with which this method is being pursued, the solution may not be far off.

Indicators

An irreversible indicator is needed to assure the consumer that the precooked frozen food purchased has been properly handled after processing. At Maxson's an indicator has been improvised that has proved successful in case lot shipments to the Naval Air Transport Command, but not feasible for unit packages.

The indicator is an ice cube, sealed in a glassine bag, and placed in each shipping case. When received, for example, at outlying Navy depots, the case is opened and the shape of the ice cube observed. If it has not changed its cubed shape, then the Navy is assured that the food had been handled properly. If a round frozen disc is observed in place of a cube, it is evident that the case has been subjected to thawing. The extent of product damage and the fitness of the food for consumption must then be determined by Central Naval Laboratories.

—End—

Butter Production

(*Continued from page* 86)

of butter are washed in the churn, and in the hardener section. The granules are then collected by screws which work the butter and deliver it direct to the molding machine. A batch of cream takes 3 to 7 min. to clear the churning-chamber, and it is claimed that the time from filling-in of cream to delivery of packed butter is 5 to 8 min.

The machine is operated by one

SPRAY TROUBLE? Consult MONARCH

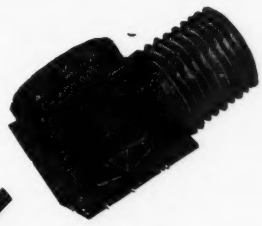

Fig. 629

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For Fast, Fine, Uniform Grinding

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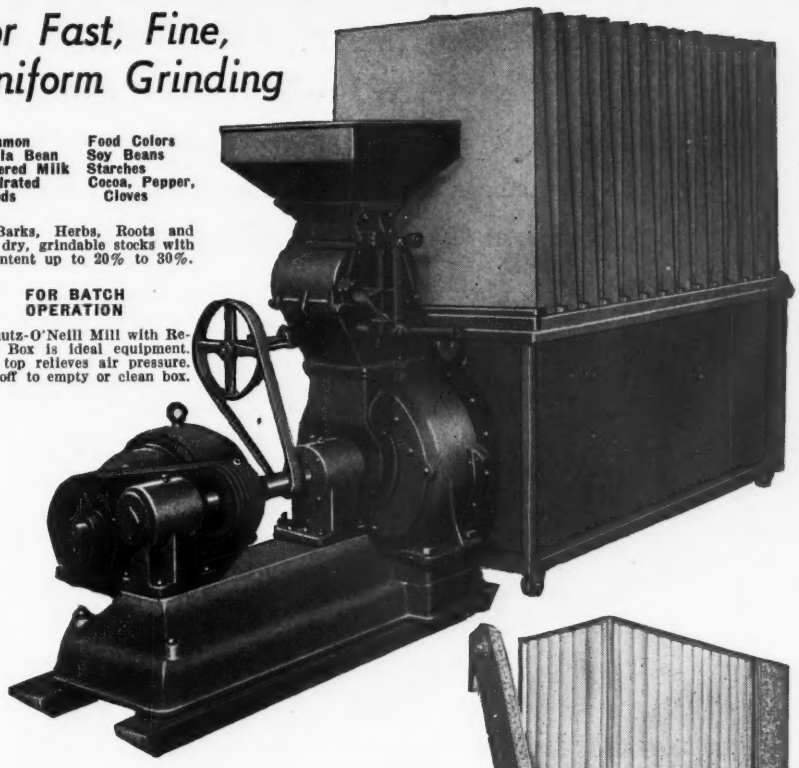
All Barks, Herbs, Roots and other dry, grindable stocks with oil content up to 20% to 30%.

FOR BATCH OPERATION

A Schutz-O'Neill Mill with Receiver Box is ideal equipment. Cloth top relieves air pressure. Lifts off to empty or clean box.



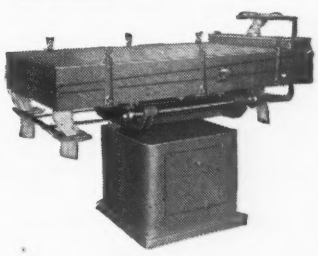
Schutz-O'Neill Pulverizers utilize the principle of centrifugal air force impact, which is fast and produces a uniform product for superfine grinding up to 400 mesh. For products with high moisture or oil content, Schutz-O'Neill has special equipment. Schutz-O'Neill Pulverizers are made in 12", 16", 20", 22", 24" and 28" sizes with capacities ranging up to 2,000 lbs. per hour.

FOR CONTINUOUS OPERATION

the expansion Tubular Collector with screw conveyor feed to elevator discharge will handle from 300 to 700 lbs. per hour of most products.

Consult Schutz-O'Neill ON PULVERIZING PROBLEMS

Schutz-O'Neill has a great variety of Mill Plans for different purposes. If you will write us your requirements, products to be pulverized, output desired, and send a sample Schutz-O'Neill engineers will recommend the correct size and type of mill and the most efficient Mill plan for your use. This in no way obligates you. Literature on request.



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The Schutz-O'Neill Gyrator Sifter produces a ground product free from threads, fibre, waste, coarse particles, etc. Made with 1 to 4 sieve frames for single or multiple separations.

Some territories are open for Sales Engineers on Schutz-O'Neill products. Write stating qualifications.

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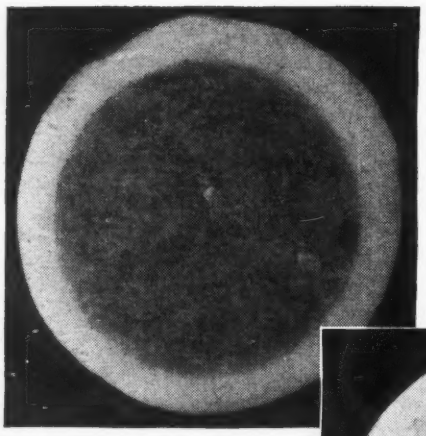
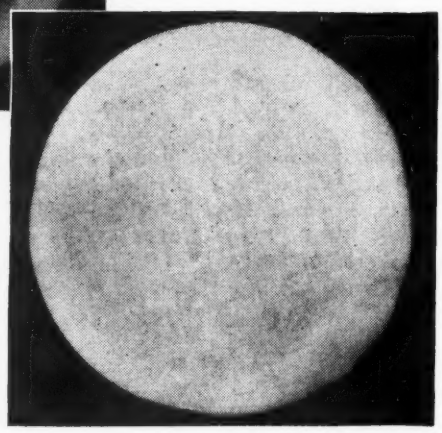
In addition to being U. S. P., Sodium Benzoate produced by Tennessee Products & Chemical Corporation is given the *pure milk sediment test* in order to assure absolute cleanliness and highest purity. *Examine these actual photographs:*



LEFT — *Sediment from ordinary U. S. P. Sodium Benzoate.*



RIGHT — *Sediment from Tennessee Products & Chemical Corp., U. S. P. Sodium Benzoate.*

If you are interesed in high purity along with the best of service, specify *Tennessee Products Sodium Benzoate.* Available in both flake and powdered form.

TENNESSEE PRODUCTS & CHEMICAL CORP.

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man who controls a cycle of operations for each batch. The 25-gal. machine covers a space 13 ft. x 7 ft. x 13 ft. high, and has a capacity of 700 to 1,200 lb. per hour. Dimensions of the larger machine are not known to the writer, but its capacity is rated at 2,240 lb. per hour. The Senn machine appears to be very well-developed mechanically, with extensive systems of control available to the operator.

The butter is run through in small batches. Information is not available to show whether this affects the uniformity of composition. The physical properties can be expected to resemble normal butter, and composition, except for a high carbon dioxide content, is normal.

The information on fat losses is not clear, but the claim is made that losses are considerably lower than for ordinary churning processes. The cream apparently is cooled in the normal way, so that the normal amount of cooling water is used. Three lots of wash water at 37 to 38 deg. F. are used, introducing considerable added refrigeration costs, and in addition, ½ lb. of liquid CO_2 is used per 100 lb. of cream or per 48 lb. of butter.

Costs

The cost of CO_2 on so large a scale would amount to about ¼ of the total labor costs of butter-manufacturing in New Zealand at the present time. The cooling costs for wash water would also be high, and the power costs are higher than for normal churning. When these added costs, and the depreciation allowance on such a costly machine, are taken into account, it seems open to question whether the Senn process will be economically competitive with the present system of churning. A 2,000-ton factory in New Zealand will produce 9 tons of butter daily in the flush period. On the assumption that the Senn Machine will deliver 2,000 lb. of butter per hr, the machine would be running for 9 hr. daily.

The Senn machine would be very convenient in operation. It can be connected direct to the cooled-cream hopper, and so give an immediate conversion to butter, apparently without the high fat losses that this procedure would entail with our present churning processes. But immediate churning would not be necessary, and in most factories would be found more inconvenient than the use of holding vats as balance tanks. The capacity of holding vats required would be smaller than at present, since the churning could be commenced as

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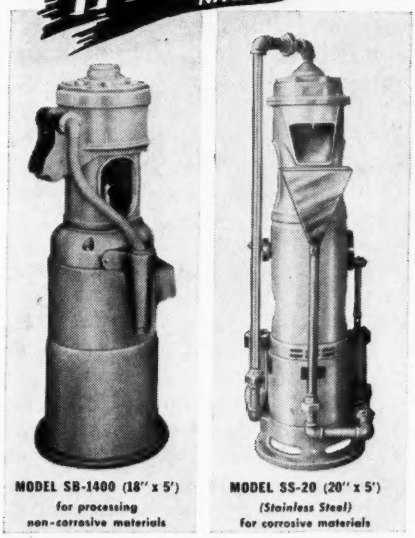
MOREHOUSE HY-R-SPEED MILLS



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MODEL SS-20 (20" x 5') (Stainless Steel) for corrosive materials

Multiply production—Improve quality—Save space

Now you can have processing equipment that is amazingly compact, versatile and efficient at half the cost of old style mills. Occupying only a fraction of the space required by ordinary units, these new Morehouse models produce several times as much—better and more efficiently. They are designed for use on a wide range of materials, both wet and dry. Adjustment is quick and easy, either for individual materials or methods of processing including

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Operating records prove that "ENTOLETER" Continuous Control destroys all forms of insect life. In addition to this service, mills and food plants are reaping other benefits from the "ENTOLETER" system. Here are three positive advantages.

1 KILLS ALL INSECT LIFE

Now, more than ever, your plant and products need the "ENTOLETER" system of continuous insect control. It helps you to avoid waste of scarce food materials . . . to protect product ingredients . . . to insure the high standards of your products.

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The "ENTOLETER" system is being used successfully to reduce fragment count. Send for a copy of our latest bulletin describing methods of application.

3 AIDS PRODUCT UNIFORMITY

Food plants and flour mills have found that the "ENTOLETER" system offers an excellent means of blending flours, mixing ingredients in compounds and improving vitamin distribution. This, alone, more than justifies its cost.

For New Bulletin on "ENTOLETER" Continuous Insect Control System, write to ENTOLETER DIVISION, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Connecticut.

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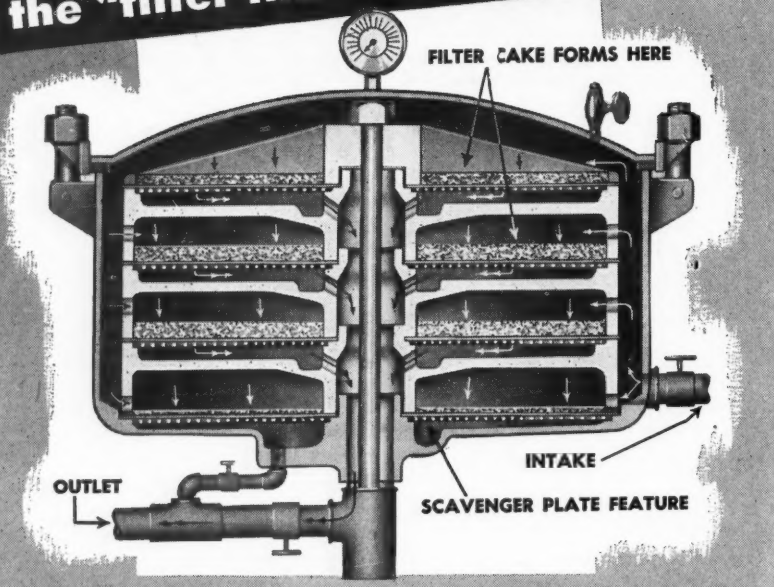

SPARKLER

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soon as processing had been started. In view of its cost, it would not be economic to use the machine for only a short time each day.

Where most of the factory production of butter is sold in the form of 1 lb. pats, the direct integration of the churn to the printing machine in the Senn process, as also in the Fritz, New Way, Cherry-Burrell and Creamery Package processes, would be a great convenience. The butter would come from the machine ready for packing into boxes for distribution to retailers.

General Summary

The processes discussed are in course of rapid development, and other processes may be brought forward in the near future. It is not possible to forecast where these developments will lead. In Europe, where three of the processes have been developed, the factories are small, and receive whole milk and not cream. The application of the new methods to New Zealand conditions is not likely to give the favorable change in cost of manufacture claimed for them in Europe.

None of the processes, except the C-B and CP processes, appears directly applicable to New Zealand buttermaking without some modification, and it is difficult to decide which one of them offers the greatest promise of general acceptance. The Fritz process would fit most conveniently and would appear to offer the greatest economy in labor. On the other hand, there is no improvement in yield over the present system, whereas the separation processes give a definite improvement in yield. The Senn process would also fit into the New Zealand scheme of factory operation on home-separated cream, and is claimed to give a higher yield, but any advantages it possesses would have to be carefully balanced against the added costs involved.

Butter made by the present churning process has a certain uniformity of character, and is spoken of simply as "butter." If the new processes become generally adopted, there will be normally churned butter and new process butter on the market, and on account of the differences in density and in general character, except with the Senn process butter, the different types of butter would probably have to be segregated for putting through molding-machines, in order to avoid differences in butter color, and variations in print weight.

If more than one of the new proc-

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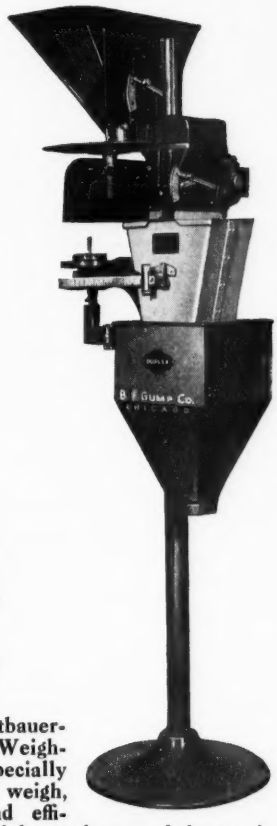

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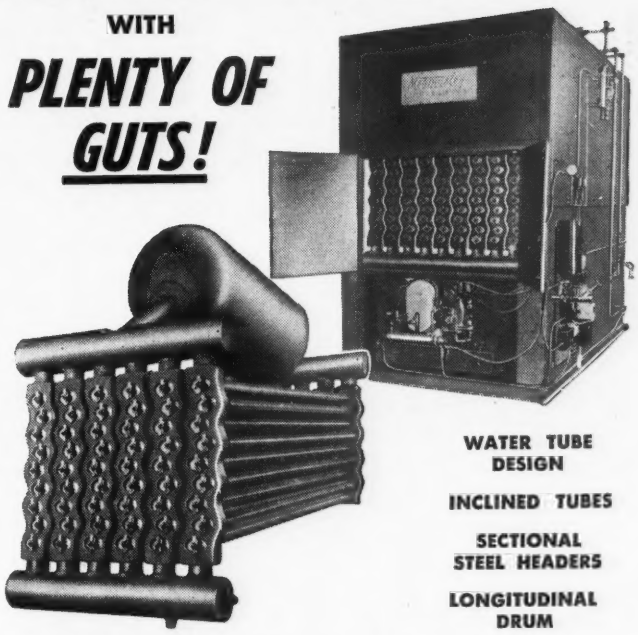

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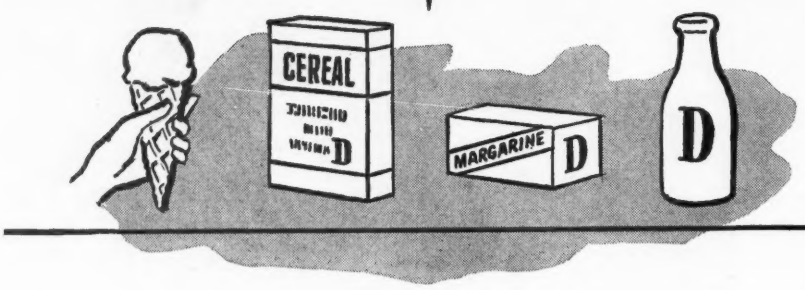

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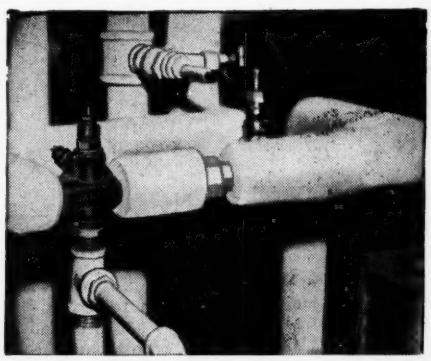
esses becomes general, the term "butter" may no longer be an adequate description, and butters from each process would then require a character label to enable purchasers to segregate them, or some form of worker, such as the Abel vacuum worker, would be required for treatment before patting. It is safe to say that even if one process emerges superior to all the others, this state of heterogeneity of butter character would continue for a long time, until all factories had changed over. The possible effect of this on the butter trade, in its competition with margarine, is difficult to visualize, but should not be overlooked.

The most important, in fact the primary consideration, is the quality of the butter produced. Butter is a high class food, and it would seem to be a fatal mistake to follow the lure of increased yield or lower labor costs, or both, before it is clearly established that the butter from the new process has all the good qualities of normally churned butter. This has not yet been established by independent published investigation, for any of the processes.

—End—



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